



Clinic Notes

25th Annual Meeting

National Collegiate

Track Coaches

Association

at

University of Michigan

June 1954

**combined with Clinic Notes of
January 1954, Cincinnati Ohio**

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Phil Diamond
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CLINICAL NOTES

The Winter Track and Field Clinic of the NCTCA was held in the Hotel Sheraton-Gibson in Cincinnati, Ohio on Friday, January 8. The meeting was called to order at 2:10 P.M. by Chairman Ken Doherty.

In his introductory remarks Chairman Doherty began by expressing his gratification at the fine turnout. (A show of hands indicated attendance from at least ten states, from Rhode Island, N.Y. and Pa. in the east to Kansas and Iowa in the west.) The chairman said that at their last meeting the NCTCA had decided not to hold a regular meeting, but to get together in a clinic, to be held not only for the edification of the attending coaches for improving coaching procedures, but by using a tape recorder and publishing the notes, to enable all the coaches around the country to benefit. By all coaches he meant coaches at both the college and high school levels. "We have the finest potential here for a track clinic we've had in a long time. The panel members have prepared diligently for the meeting. They have gotten together, as you will see, loop films, something relatively new in this country but used for a long time in Europe, strips of film four to eight feet long tied together so that they can be run over and over. They have selected outstanding material over the past ten or fifteen years, not merely present champions but also the outstanding high jumpers of past years, Albritton, Steers, etc. They spent approximately four hours this morning organizing the material, going over films and preparing generally.

Speaking personally, I have an idea that we can improve in this country as a whole our clinics and the use to which our clinics are put. I have a personal feeling that we can employ to a much greater extent the research which is done in connection with our Physical Education departments and our Physiology departments that has some direct relationship to Track and Field. I'd like to see us draw some of these research people into our NCTCA clinics. We still talk about the material Sid Robinson has given us on the physiology of distance running. There are other men in the country who have similar material to offer. We have had a tendency to call on this or that coach and ask him to report on what he personally has found worth while in each event. This has been of great value. Much of the progress we have made in the last 50 years can be attributed to that approach. But I think we are now getting to the point where we need to move beyond what the individual coach thinks, and try to find out what really are the facts as we can discover them as to the value of this or that method. We shall do that only partially today. I hope that as the clinic moves along, we shall be bringing in more of group discussions around a particular point and as much as we can, to find out the facts as to the merits of this system or that position or whatever it might be in Track and Field and thereby make some progress. I was very much aware, back in 1928, of the tremendous amount of research the Germans were doing at that time, studies of all kinds, and there was a great deal of publication of materials in Germany over 1928 to 1932 and I think that in part the tremendous upsurge that Germany made in 1936 can be attributed to some of that research and some of that printed material. In similar fashion I think Japan followed a comparable program in their swimming work, building up to what they accomplished in '32 and perhaps to a lesser extent in '36. I believe we also could make some moves in this direction and hope that this will be a beginning."

The chairman then outlined the general plan of the clinic. "This clinic is to consist of five sessions: (1) The high jump, (2) macadam surfaces, (3) distance running, (4) sprint starting and—there are really two more, (5) hurdling, and we do have the 1952 Olympic films so really there are six parts. In each case with the exception of distance running, we shall be using loop films. Each group will perhaps organize its plan differently but in general we shall show the loop films first, and while this is being done, cards will be distributed for questions which may come to mind while the discussion is going on. After the films there will be a question and answer period. Dave Matthews will distribute the cards. The purpose of this method is to keep the discussion organized and to the point, to prevent digression as so often happens in question periods; there will be 30 minutes of questions and answers after the panel discussion. In each case a high school coach has been invited to sit with the panel. The importance of the high school coach is being purposely emphasized in order to bring out the problems peculiar to the high school in each of these areas. There has always been a tendency on the part of the college coaches to monopolize the discussion in terms of their own problems, but here we want the high school coach to have at least as much attention as the college coach."

The chairman then introduced the three panelists for the high jump: Art Reisner, coach at Cincinnati Central H.S. was praised for his interest in and enthusiasm for Track and Field and for the success he has enjoyed in spite of unfavorable training conditions. (He is credited with having run his boys on a treadmill when other facilities were unavailable.) Then the chair introduced Larry Snyder of Ohio State, recently assistant coach of the U.S. Olympic team and producer of Albritton, Walker and other

champions. The third member was Don Canham of Michigan, a former National Collegiate co-champion in the high jump, "who has had a great deal of success with high jumpers at Michigan and incidentally has one of his best now. Canham has recently written an article on the high jump so his mind is particularly alert to the problem right now."

The panelists then came up to the speaker's table. Don Canham introduced.

PANEL ON THE HIGH JUMP

Don Canham, U. of Michigan, Larry Snyder, Ohio State,
Art Reisner, Cincinnati Central H.S.

"We got together this morning and looked over hundreds of feet of loop films and decided on eight or ten which we thought representative of what we wanted to offer. As we talked about it, the thing fell into a pretty good pattern from the standpoint of presentation. There's very little new to be said about so many things in Track and Field but I don't think that's true about the high jump. I think there are some trends in high jumping which have been developing for years but which are just crystallizing now. I'm afraid you're going to find, certainly in my case and possibly in Larry's, that there are some things we don't know the answers to yet. These movies should raise a lot of question in your mind; they certainly did in mine. There's only one thing lacking and that's the Illinois gymnastic coach; if we had him here we'd have everything. What we thought we'd do (incidentally, Larry should be doing this but he pulled his rank on me) is just say a few words on what we think is the consensus of opinion on the various phases of high jumping. When you see these films you'll see the exceptions to the rules as well as the perfectionists who exemplify just what we want to teach and what we think we should teach today. Then I'll say a few words which come to my mind and I hope Larry and Art will do the same. The first thing, of course, (we're going to be very brief on this because we're going to enlarge on each point as we show the films) the first thing is the approach to high-jumping, the run-up. In general, the average jumper, we felt, runs from 30 to 40 feet. Some jumpers take 7 steps to the bar, some 9, some take less but it has to be between 30 and 40 feet for momentum. We feel that the speed increases as a rule, then you run into a case like Shelton, the best college jumper in the U.S., who decreases his speed. In general, however, the jumper increases his speed; there is acceleration to the take-off. We feel that the run must be relaxed and we feel that it is desirable to have an even run; and today you'll see two world record holders who probably have the most uneven runs of all time. Yet in beginners especially, we feel that those things are important. On the take-off—there are so many phases—one of the most important things is that the take-off should be vertical or as vertical as possible. On this point we are often misled by what we say is not a vertical take-off. Wait until you see Albritton's pictures today; we always say that if Albritton had learned to take off over his foot he would have jumped 7 feet or better but when you analyze Albritton's form you will see that he did have his center of gravity over his foot. He would be in this position (illustrating) but his center of gravity would still be over his foot and the style that Albritton capitalized on made that necessary. But in general we feel that the weight should be over the take-off foot. We feel that the foot plant is heel first and the faster the approach, the greater the acceleration, the greater the degree that the man will drop down on his heel. The flat-footed take-off as shown by Shelton particularly, is that of a man who is approaching rather slowly. But when you're drawing conclusions about a man who approaches the bar with decreasing speed you're not drawing accurate conclusions because he's not average. The average jumper accelerates, as we mentioned, so we feel that the plant should be heel first. There is a good deal of discussion on type of shoes, etc., we could get into but we won't here. One other thing on the take-off. We realize that there has never been a straddle jumper who planted his foot in line with his run. I say "never," I say of the 15 or 20 outstanding jumpers we have photographs of, we have never seen one who has planted his foot in line with his run as we want it in the western roll. He plants his foot off to the side, so (illustrating). In the straddle he would plant his foot more perpendicular to the bar. The reason is that subconsciously the straddle jumper wants to get his chest down on the bar, he wants to turn into the bar, and no matter what you do you can't change his way of jumping. I think Ken will bear me out in this; one of the reasons I jumped fairly well was because I had probably as good a vertical take-off as anybody did. I didn't have the ability a lot of others do but I did have that one thing but even with my good vertical take-off I never could plant my foot in line with the run, it was always perpendicular. I think this is something we ought to think about. Do we want to coach that? If we bring it to the boy's mind will it turn him into the bar still more, or do you forget it and leave it as an incidental thing that you know will happen? We hope we'll be able to bring all these things out today."

Now, on training. I think Larry has had far more experience in training great high jumpers than I have. As you know, he has had two world record holders and so many 6'6" jumpers that we can't count them so I wish Larry would say a few words about training, what he did with men like Albritton,

Walker, Dubard, Murphy and some of the others. And Larry, if you would say what you think should be said about landing, then we'll run these loops through. Dan Kinsey, incidentally, has done as much or perhaps more work than the rest of us in collecting these high jump films and we're going to use the loop films and also the magic eye or whatever it is to project photographs. We'll have about an hour to do it and I think we can wrap it up pretty well and still allow time for some questions. So, Larry, if you'll just say a few words on training and landing."

(Snyder) Thank you, Don. Good afternoon, gentlemen. Training a high jumper, I believe, is getting a man ready, not only for the high jump but for many other events. I don't believe we have ever had an individual who was just a high jumper. We've always tried to make runners, hurdlers, broad jumpers in addition to high jumpers out of each man. Dave Albritton credited a great deal of his ability to jump to the strengthening of his legs, not only on the fact that he ran on our mile relay team and ran the high hurdles but because he worked for our groundskeeper two hours every day pulling a hand roller and a brush around the track and down the runways. He felt that that strengthened him and gave him the additional spring and strength that he needed for his event. Mel Walker, who jumped the same height as Albritton, got the majority of his work in the low hurdles. He would run six or seven flights of low hurdles every afternoon. He just loved it. He'd start running over about five hurdles, then he'd work up to 7 or 8 and about the time the afternoon was over, mixed in with a half or three quarters of an hour of high jumping, he would have run what amounted to six or eight full flights of low hurdles. He always finished up with a full 220 yard flight. So I think you need to build legs for the job of high jumping. If you can get them to run and run fast enough you have an additional man on your track team because I think jumping (you may not agree with this, Don) doesn't take very much out of a man. The high jump is an event a man can do and come right back into a hurdle race or the broad jump or any other event without feeling that he's had the edge taken off. I would except, of course, the 6-8, 6-9, 6-10 jumper. I'm thinking of the boy who competes weekly and you want him to work on your dual meet team. So I'd say, don't be afraid to work your high jumper hard; start him early in the season running, hurdling, jumping, then, of course, cut down some, would be my recommendation, on the jumping that man does during the competitive season. I don't believe that the average high jumper, the average top-notch jumper, can do what Steers did and jump day after day at great heights, even through Friday as Steers did during the early years of his great jumping. I think that takes the edge off. I believe that a high jumper does store up energy in that leg for jumping competitively so we don't usually jump our men after Thursday of any week.

Don asked about the landing. I have always used landing for the boy himself to judge whether he made this vertical take-off Don talked about. Instead of a vertical take-off, I ask them to get their center of gravity above their jumping foot and Don showed you the position Dave was in. Get the center of gravity over the jumping foot and then the drive will be applied up, the head will go up, the shoulders and everything. If that is leaning and the same amount of drive is applied, the boy's head slides over and the body doesn't go up; instead of the "peaked" high jump, as we call it, where the man goes up and down, you get the rounded jump without a peak to it. You'll see some styles this afternoon where the men intentionally lower their head, lower their center of gravity over the bar but they are still vertical. They still have the center of gravity above the jumping foot as they leave the ground; they then go into their jumping position while they're in the air. And I've told these kids that if their hands hit the pit first, they can feel pretty sure that they have been leaning too far over turning into the bar and that their center of gravity was not above their jumping foot when they took off. You'll see the world champion this afternoon land on both hands. He does it with his quick turn of his head that gets him down there but I think for the boy whom you have in training, the high school boy whom you're starting, try to keep him that he lands—make him learn that he wants to get a foot into the pit before his hands hit. In the straddle roll it will be his lead leg, in the western roll it will be his take-off leg but have that foot down into the pit before the hands hit and I think you're going to have a boy who is having a more efficient jump at the time of the take-off. Art, do you have something to add to this? I'm sure you will have.

(Reisner) You have covered things very well but I think we high school men might contribute a little if we know more about the events ourselves, especially fundamentals. - - - - We get the high school jumper who knows nothing, probably, or maybe he has picked up something elementary in Junior H.S. Unless he has been well-coached, it's very, very difficult to overcome two main things, as I look at it. One is training, which Larry has spoken about here. The boys don't want to train; they think they just want to jump and that is all. I have quite a battle but I usually succeed. I either have them run the high hurdles or in the mile relay. (This is my own opinion and I may be wrong.) I prefer the 440 for training for the high jumper rather than the hurdles unless a man has an aptitude for it and really likes it. - - - - I find my main trouble in getting these fellows to understand that jumping is the least of their job. It's condition first. We spend a lot of time in conditioning; if there is any likelihood of him being a mile relay man, if he's fast enough in the quarter, I'll work him with my 440 men. If he's a hurdler,

a high hurdler, I'll work him with my hurdlers or sprinters and every day he will do the same work that they do. He takes his warm-up laps, usually a mile, he does his exercises for at least 15 minutes—we sometimes go as much as 30 minutes—and of course he specializes in the things he's going to need, the high kick and especially exercises to strengthen his back. High school youngsters are more apt to strain their backs than a college man because they don't realize the importance of general conditioning. And then he goes on to his work. I find my chief trouble is getting them to understand they've got to be in top shape physically if they're going to go through an entire meet as we do in the high schools where they have to jump more perhaps than they do in college meets. On the approach, I have all my men take the same approach. We stand back far enough, with both feet parallel and I simply lay down the rule—seven steps—because when we get them they have seen somebody do a skip-step or a hop or a snake dance so I just insist on the one approach. I make them stay with that until they have mastered it and if they get so that they can jump over 6 feet I don't care how they take off or run. I find that I've had more success by being insistent and determined that they do that. Now for speed. Last year we had to hurry, our track wasn't completed, our pits weren't completed and we entered our first meet without one day of practice. I tried this: I had the boys get out on the track and had them start there in their high jump approach and run until they had it down pretty well rather than have them go at the bar time after time and not jump. Then I brought them to the high jump pit and had them run from there. As to the take-off, I find this. As you know if you're a high school coach, every high school boy now wants to do the belly roll, he wants to roll some way and it's the hardest thing to get him off his feet and get up in the air. He wants to get into that bar, no matter how he does it, he wants to get over it. I start with the Western Roll first; it's the only jump to teach. In fundamentals we work on the western roll first and after the boy masters that (as far as you can expect that in high school) then I let him try the other jumps if he wishes. But not until he can get vertical, get up in the air, and that's the one thing they won't do. They want to swing that leg up and they want to kick up there before they even leave the ground. That's our hardest job, to get them up. The landing Larry has covered. In Cincinnati we can't get good high jump work in our elementary schools. We're trying the junior high school system this year, all of our junior high schools are trying to bring athletics up a little. But the boys come to us with the scissor jump and the roll. The western jump, of course, is out, the eastern is out. There's usually nothing but a roll of some kind and they are always either spraining or even breaking their wrists. Our hardest job is getting the foot to come down without regard to the landing. I had one jumper who landed on his back out of the pit."

The first of the loop films were then shown. The subject was Winter, the 1948 Olympic champion as an illustration of the scissors style. It was pointed out that Winter got tremendous height from his fine vertical take-off. Then pictures of Eddleman were shown as exemplifying the orthodox western roll.

During an interval during which the films were being arranged, Chairman Doherty gave a summation of recent thought on the high jump. "I have the opinion that improvement in the next 25 years to 8 or 9 feet will come more from improved utilization of increased momentum in the run than from a more economical clearance. It is my feeling that we're just about at the ultimate in terms of economy of clearance what with Cruter, Albritton, Steers and all the rest and that the emphasis in the future is likely to be on the early aspects, the run and take-off and so on. The particular question has been asked, 'How does one utilize momentum?' We don't have the facts but you can see what is there and you can make some guesses which will probably come close to the truth. You noticed, of course, the preliminary crouch on the last two strides which seems to be more extreme on the second stride before the take-off than it is on actually the last stride. There is a definite crouch, assuming a left-footed jumper (take-off from the left foot) more pronounced on the right foot than it is on the final take-off, a settling of the center of gravity of the body at that point. Bob Pitkin of Columbia made a wonderful talk in New York just a year ago on the importance of gaining momentum on the basis of the length of time through which that power works and he felt that it is essential, to get ultimate height, to be settling rather low and to stay low as you come up. Incidentally, I'm going to develop a similar point in connection with starting later in the evening. It's a matter of time and force. So that's one aspect of it. You notice, as the question implies, that there is a rather straight leg as the best high-jumpers (in terms of take-off at least) make their take-off. The left foot, the take-off foot, provides a straight leg at the take-off which prevents further forward momentum (there's almost a 45 degree angle at that point, as you will see in the pictures) and permits a stopping of forward momentum and a conversion of that in a vertical direction. So, the crouch, the heel-ball-toe take-off, so to speak, the thing that Don has pointed out in terms of emphasis on the left shoulder, these are among the things we shall watch. Certainly the greater utilization of the lead leg, straight leg high, has a tendency to bring the man back at the take-off. Most of the men who do that (Steers is an excellent example, Walker is another) those who use a good straight front leg, also have a tendency to lean back at the take-off and jump vertically."

(Don Canham) The next picture is of Davis when he set the present world record at Dayton last summer. It's a good example of the Dive Western Roll. A conscious effort to lead the jump with the head

and get the head and shoulders down before the hips come up. Incidentally, this was his third try. Notice again the hop and the skip. Now at this point Eddleman's upper trunk would be back, back more than Davis'. Davis keeps a slightly more erect trunk and once he loses contact with the ground he starts forward. His center of gravity is coming up well but his body is in motion forward. You see, his head is leading his jump and you'll see at the top of the jump that his head has started down before his hips are up, in other words, he wraps it around the bar, and in the latest literature we call that a Dive Western Roll. Just see how far down his head is in comparison with his hips. (Snyder) You will remember that Davis is about 6' 8-1/2" tall. I don't know whether he did it or not but he intended to study ballet dancing the year before this jump was made, 6' 11-1/2". (Q) Does he plant his heel or is that his whole foot? (A) No, it's his heel; he has to hit on his heel first. Maybe you can't see it in the picture but it is his heel. (The picture was slowed up to prove this point.) Notice how he puts his foot in behind his right leg. Notice although his hands are hitting the pit first, he goes straight up and it's the diving form he is using that brings the hands down. The knee of the jumping leg goes up there rather slowly, doesn't it? It doesn't ever get as high as possibly you might want your jumper to have his. (Rider) No one has said anything about the arm action yet. What's the point? Raise it, put it behind you or what do you do with it? (Canham) We got into a little discussion on that this morning. Larry and I feel that arm action can be over-emphasized. That's why we haven't said too much about it. Unless the arm action is interfering with the jump, that is, unless the arm is being carried between the body and the bar, unless it's leading a low shoulder or some such thing as that, we're inclined to ignore it although there were some others in the group that thought that it played a more important part. So that's one of the questions that I don't want to answer. Perhaps Larry-? (Snyder) I think that we all do emphasize arms a little in order to get the boy off straight up into the air but that is all. I think that Don mentioned the point that the boy must keep the left shoulder up; that's the main thing. The swing of the arms would undoubtedly help the raise in getting the man off but we're thinking mainly about positions and getting the man above the take-off foot. Any comment from the floor on that? George? (Rider) That was my idea. My only point in asking the question is that it hadn't been mentioned but I think it is very important particularly for these younger boys, to keep that left shoulder up but they don't say anything about opposite action. Left arm with the right leg. They start diving when they go into the bar so they're going down instead of up. As Larry indicated, I think that's the most significant thing and as far as the other arm is concerned, I think that will take care of itself. Keep that left one up. Opposite action. (Canham) Thank you, George. Now in this next group of pictures we have two movies and two slides; we are putting more in on the straddle because as Art mentioned, most kids want to jump this way. Again we're dividing it into the straight straddle or the Albritton straddle and the dive straddle which is Wiesner, Cruter, etc. The first one is Albritton and here again, notice that his head does not lead his jump down into the pit. That's a pretty loose thing to tie a style to but that's about the only way we can differentiate it. Here's Albritton, who held the world record along with Corny Johnson. (Snyder) You'll notice that Dave doesn't use a measured take-off in this jump. He's like one or two other jumpers we've known; he can get a measured take-off but then he couldn't jump. He had to feel his way up to the bar with a great deal of speed and then with the terrific spring that he had, a kick that would lay him out over the bar. He didn't have too much trouble with that trail leg except on days when he started getting the head and shoulders across too fast. That left his left leg hanging back over there and it was very difficult to control. He uses, as you notice, the bent knee action; he drives hard with the knee, doesn't try to get the extended leg at all. Watch this layout above the bar; he's going to be just horizontal. (Question from the floor about the head going across too fast.) I think it was caused often by his failure to hit the proper take-off point and then I think he tried harder knowing that he was a little too far away from the bar and then he'd shrug and push a little bit harder and get the head and shoulders across too fast. Art, do you see anything there from the high school angle? (Reisner) I've noticed with my boys that if I accentuate the arm movement and tell them to swing both arms up high, that will discourage them from getting the lift off the foot, or in other words, they will swing the arms up without getting the push off that foot and really get to spring up. So I had them start to the side; run up to the bar and just jump. We put the bar about 6 inches higher than they can go and get them accustomed to jumping up there so that they get their belt buckle, if they could, as high as the bar. They were trying to swing over instead of trying to get their body over. (Doherty) Larry, there's a question from the floor. Is it true that Albritton took off pretty well back from the bar? (Snyder) Yes, he took a great distance for his jump. (Q) What procedures can a coach follow trying to get a man to take off closer to the bar? (Snyder) Well, it's difficult. I had that trouble when I used to high jump using the Sweeney style. I think the jumpers who get in closer to the bar are the ones who watch the bar all the way. It has always appeared to me that the men who watch the ground and then try to shift their eyes up to the bar have more trouble in getting in close than the others. We try, as Art indicated with his boys, to take them away from the high jump and try to teach them a measured stride right in to a definite line. And without worrying about the jump, after they have done that a number of times each

day, you bring them back to the jump and try to have the feeling that the measured stride is going to take them into position. I feel in my own mind that it is governed by a man's eyes and it's a difficult thing, when a man is taking off far away, to get him in where you want him. Now some of you people here may have some other means of accomplishing it. Any ideas on that? Chic, have you used anything to get a boy in closer? (Werner) The only thing I ever tried was to teach the boy to use the measured seven strides, perhaps emphasizing a little longer last stride. (Rider) The angle of the run would make a difference. The boy can get in closer to the bar if you make the angle smaller, bringing the run closer to the standards as he runs in. The ones who have the most difficulty are the ones who run in straight to the bar.

(Canham) This is just another shot of the Albritton type of straddle where the man maintains a high center of gravity and lays out on the bar. You see that Hall settles down exceptionally low; his leg is so strong that he can settle down probably lower than any other jumper. He has a very fast run, very good acceleration. Here it's too bad that we're not behind him because it looks as if he's dropping way off to the left. He does drop to the left but not to the degree that these pictures seem to show. He has a wonderful lead leg, as you can see. He has a semi-straight lead leg almost like Mel Walker had and a tremendously high center of gravity. You notice his lead leg is so high that it's pulling him up. (Snyder) I might mention that in the picture on the left you'll see where his right foot was on the stride prior to the take-off; it moves way out off of his line of approach and then moves straight in to the bar with his take-off foot pointing directly toward the bar, as Don mentioned earlier. (Canham) Notice that he's not leading his jump with his head, he's not diving. In this next series of pictures with Wiesner and Cruter you'll see the other type of the straddle where the man wraps around on top. Larry has mentioned that he is turning his left toe toward the sky, in other words, he's flipping his hip. He does a frog kick and turns his toe toward the sky and of course that throws him over on his back. (Q) Is his left arm on the other side of the bar? (Canham) Yes, he keeps his arm away from between his body and the bar. (To Dan Kinsey) Oh, you have the Steers picture. Why don't you comment on this?

(Kinsey) Watch as he comes in, the smooth run, not too fast. As he puts his left foot down, from here on in, watch his hip action. See his hips go way forward? He gets his center of gravity over his take-off foot. Now notice his kick. He gets all the impetus he can with his right leg and then he relaxes. Watch the muscles on his right (?) thigh; see him relax? Notice as he goes up that his head makes no forward progress. At the top of the bar he keeps his shoulders rigid, parallel to the bar, then watch him rotate his hips. (There was some discussion here on the handling of the trail leg.) (Question from the floor) I have a problem. I have a boy who gets in there high but he can't do anything with the drag leg. He has to go about a foot higher to get that drag leg over. (Kinsey) There are several ways of doing that; one of them is to throw that leg out. (Rider) I think that if he would reach for the pit with his right arm he'd be improving his jump rather than trying to imitate this fellow. I think that's an error, myself. (Kinsey) If he does not rotate his hips as rapidly as he does, he may have to kick that leg out, straighten it out to get the knee higher. (Rider) He's got a very good straddle there, a good spread. (Kinsey) I don't think it's possible to rotate the hips as fast as he does and get his shoulder up at the same time. (Holmes) May I tell you what Steers told me about his arm? Steers said his trouble was with the Western form; he was up to 6'6" always, using western, before he changed to belly roll he could not put the left arm where it belonged. In the later years of his life the left arm was even farther forward keeping his shoulders a little to the right instead of back where they belonged. In later pictures his left arm is even farther forward than it is here. He could not put the left arm backward and turn toward the pit. (From the floor) In his early jumping he had his left arm between his belly and the bar. (Kinsey) Well, this is what he does here. (Q) How high was that, Dan, do you know? (Kinsey) 6' 8". (Reference was made to Steers' habit of clearing high heights many times a day, day after day.)

(Canham) Now these are the men who dived, in contrast to Hall and Steers and Albritton. The first ones are slides of Gil Cruter of Colorado who was really wrapped around the bar, as you can see. (Snyder) I think that all of us who saw Cruter jump for the first time were astounded that he could wrap himself around the bar the way he did and not knock it off. He had the jump perfectly timed. I can recall the dive form, as Don called it, and I think it's a very fine name for it. You see his head start down as soon as he crosses the bar and that apparently is what enabled him to continue his roll right on around and get away from the bar. Note his approach angle. (Rankin) The approach angle as he takes off is practically parallel to the bar. (Snyder) He comes in from straight out and then turns as he gets to the bar; he drives out, he uses that same kick that Albritton used, the knee leading, which is a very powerful kick. The other is more beautiful and I think it is a great advantage in the western and Steers used it to good advantage in the roll. But with the knee leading it is a powerful action. (Q) With his head going down, what do you claim for that? Actually what happens? (Snyder) I don't know. Let Don answer that; he's the high jump expert. (Canham) This style over the other? There must be a positional advantage, a much lower center of gravity. (Kinsey) According to the laws of physics there is no possibility of increasing your height after you've left the ground, so that it must be not a momentum but

a positional advantage. (Canham) That's right. You can jump higher with the same center of gravity with this style than you can with the other but when you're diving you're also handicapping yourself on the take-off, as we have seen. You don't get an Eddleman take-off with Davis but you get a more efficient bar clearance with Davis than you get in Eddleman. A tall boy, I think, in particular has an advantage in jumping with the dive. Now Cruter was very tall and of course Davis is very tall. We have a boy now named Milt Mead who is very tall; he can look beautiful with an Osborn western roll but he can only jump 6 feet and he has jumped 6'8" with the dive. I think, as you say, that the advantage is definitely in position and the advantage of the position is usually in favor of the tall boys, or in other words, the dive might not be the right way for a short boy to jump. But other than that, we're not sure ourselves. I agree with you that it's all position on top of the bar. Now we have the one on Ken Wiesner on Dan's projector.

(Snyder) This picture was taken at Helsinki. Ken, as you know, is a very powerful boy, came in with nice, smooth strides, gathered momentum, then with a tremendous drive he usually leaned toward the bar. Watch his take-off here and I think you'll see that he starts over toward the bar before he gets off the ground. See, he's dropping that left side right now but not to any great degree. Now he's down. See that head going across the bar? He's making a dive out of it. He has a bent lead leg. I noticed on dozens and dozens of his jumps, just prior to this position that his take-off foot would be way back over his buttocks. He had the knack of bringing that foot way back over it and it helped him a great deal. I've never seen a back leg like this before. Wiesner jumped 6'10-1/2" indoors, you will remember. He weighed 205 pounds. (Canham) Notice his left arm under when he goes over? He did that when he was at Marquette all the time, right across his belly but he bent far enough over the bar that it didn't make much difference. (Snyder) I believe he came back after two years of layoff, is that right? He was in the service and I believe that he told me that he had two years without any jumping at all, then came back and started getting into shape until he was better than ever. (Canham) That's about it. We have one more short here of Patterson but we're just about on time and there might possibly be some questions you'd like to ask. I hope we haven't confused anybody. If there are any questions we'd be glad to try to answer them.

(Q) It appeared that Albritton raised his head at the top of his jump. Was that intended? (Snyder) No, I don't think it was a conscious effort. As he straightened out it was almost a convulsive action. All at once he straightened out arms and legs and he did it almost instantaneously. He just went from a bent position into a layout. (Doherty) There are several questions which have come from the floor. The first one I can answer myself. Are these discussions going to be mimeographed and sent to the coaches? Bill Easton is here, the Secretary-Treasurer of the NCTCA. Bill, will you answer that question? (Easton) They will be as soon as they are transcribed and put into notes. (Q) And how will these particular coaches get these notes? Join the organization. This gives me an excellent opportunity to invite you to join the NCTCA. It's a fine opportunity to make a contribution to the cause, to gain knowledge in this great field of track. We'd be glad to have you make an envelope, put your name and address on the outside and enclose five dollars for men on the collegiate level and three for the high school level coaches and I will be glad to accept them at any and all hours up to closing time if you'd like to pass them on to me. (Q) Bill, aren't we paid up until the June meeting? (Easton) Yes, if you have paid your '53-'54 dues you are paid up until June. The minutes and the Clinical Notes from last spring have been held up because one of the coaches has not turned in his article on the broad jump to me and I have given him just two weeks to get it in or we're going to have to go without him. If you're interested in the Clinical Notes, we have back copies for \$1.50 which run back for several years and have just this kind of material in them. I know you'd be interested in having them and if you'll address your letter to me enclosing your check for \$1.50 and tell me which you'd like to have, last year, the year before, or whatever it is, I'll be glad to send them to you. Anything further you can think of, Ken?

(Doherty) Here is a question not directed to anyone in particular. It's a lead question. Isn't it true that the ordinary novice jumper runs too fast and the better jumper has a tendency to run too slowly? Not enough acceleration on the take-off? (Snyder) I don't believe I ever noticed that about a beginner jumper going too fast but of course we don't get too many beginner jumpers in college. Art, come on over here while I'm talking. I think that some boys will run fast, some will come up more slowly. It's up to the coach to decide the speed that the man should run to get his best jump. Art, you see the boys as beginners, what do you think of that? (Reisner) I feel that the question is right, that the beginner does want to run too fast; he wants to get over that thing in a hurry. He thinks he gets his height by running fast and getting up in the air; he forgets he has to stop in there. I try to explain it to my boys this way, to my broad jumpers too. If you have two locomotives going at the same speed coming together, what happens? They've got to go up like this (illustrating) and that's the same thing you're going to try to do, run up there with enough speed for the height you're trying to jump and then put on the brake and go up. After I do that for a while, I have them come in from the jumping side, they just

leap up in the air, as I said before, to break that habit of trying to dive over. I find that that slows them up. Then they find they have been running too fast; they carry themselves into the bar, which you don't want. We want them to go up from the front or the side of the bar so that they go right straight up in the air so their belt buckle hits the cross bar. If they can do that and the bar is six inches higher than they can jump, it proves to them that they can go over that height if they get their form down, if they get their run and their take-off just right. I found that it is true, they do want to go too fast. (Snyder)

Thank you, Art. Don Canham has a sophomore jumper who is a good one who I believe runs full speed, or at least he seemed to when I saw him. Don, will you tell them about the boy? (Canham) We have a little boy, he's 5'8-1/4 and he jumped 6'7-1/4. He jumped in only two meets last year, 6'6-3/8 in the first one and 6'7-1/4 in the other. He runs faster at the bar than any jumper I've seen including Bill Stewart, the boy from California. When he hits the take-off he hits heel first and slaps so that you can hear it all over the field house; he pops right up in the air. One interesting thing about him is that he's like Steers; he jumps seven days a week including Friday night before competition and Sunday morning. When we put the basketball stands up he takes some of the cross members out and starts his run under the stands so he can get his jumping in. He's been jumping that way since a year ago last fall. I don't think he's missed more than two or three days of jumping. (Q) Is that Booth you're talking about? (Canham) Yes, he's that little boy from Cadillac, Mich. (Q) What characteristics are uniform in the better high jumpers in the execution of the jump? (Canham) We've been over that but it won't be hard to repeat. Uniform characteristics are acceleration, a heel-first foot plant, center of gravity over the take-off foot, a pendulum swing of the leg, either bent like Albritton or straight like Steers or Walker, and then, of course, any variation of the forms of clearance you've seen.

(Q) The question comes up in coaching a boy beginning in the high jump. He may be either a bent-leg or a straight-leg jumper. If he's a bent-leg jumper he may easily run too fast; if he's a straight-leg jumper he usually can't run fast enough. Now how do you determine if you're going to teach the boy the bent leg or the straight leg? (Reisner) I don't know if I can answer that. If my boy goes in with a straight leg and he leans back too far, I bend that knee for him. In other words, if his swing lifts so high here that he carries himself over into the bar, that's wrong. I'd rather have him get that leg in the air and get his lift off of there and get that swing up. I try eventually to get that leg straight. But I have had boys lean back too far into the bar. (Canham) There's one point we missed talking about. Where does the jumper aim his lead foot or in what direction is the kick usually made? Les Steers always said that he tried to kick parallel to the bar. Of course with a bent knee you don't find that. I'm absolutely certain in my own mind that with a semi-straight or a straight lead leg the jumper must attempt to kick parallel to the bar or kick at the far standard. It not only helps him get over his foot but he can also work in closer to the bar than he otherwise could and get a more vertical jump. I've never had a bent-leg jumper like Albritton and I don't know what I would decide on as to the direction of the kick. Larry, what did you do? (Snyder) I just let it handle itself. (Doherty) Before you leave that question, Don; we all have this problem about the straight lead leg and its effect on the jump itself. When you emphasize that straight lead leg it seems to take away from the jump, at least temporarily. Would you care to comment on what procedures you follow or how much patience you have and how many months of work you do in balancing one against the other? Like all aspects of this or any other event; just because a thing doesn't work in the first hour or week or month or year doesn't mean that it can't be learned eventually. This aspect is one of the most difficult ones and I think that's the reason why so few jumpers use it. There's no doubt in my own mind that the use of the straight lead leg is superior to the emphasis on the lift of the knee itself but it takes a much longer time unless you just happen to work into it. We all, I think, have a tendency to give up on it, coaches and jumpers both, before we have worked with it long enough. To think about that knee naturally takes longer and he can't jump at all when he thinks about the lead leg. So in terms of ultimate production in jumping, I think we all need to spend more time on that aspect. I have the same opinion in regard to the speed of the run, incidentally. Again that's something that must be developed over many years and many thousand jumps but we've had a tendency to give up on utilization of speed because it's so tough to perfect, but that's another subject.

I think you'll all agree that we've had a very interesting setup here and very worth-while comments in regard to the high jump. I'm sure you will agree with me that the panel is to be given definite credit for the work they've done and the insight they have shown in this event. We're five minutes over but I think we started five minutes late so we're moving along in good shape. We have a talk on macadam surfaces coming up but let's take a five minute break now. Don't get lost and I'll try to pick up that five minutes later. (Applause.)

(Doherty) The next talk on our program is listed as "Macadam Surfaces" but it also implies concrete or any other hard surface for the field events. We couldn't agree last night on how long Nebraska has had hard surfaces. How many years has it been, five or six? (From the floor) Longer than that, Kenneth, they've had it for ten years anyway. (Doherty) For some time, to my certain knowledge, in the northeast they have used hard surfaces, concrete primarily but also macadam for the weight events, for

the hammer throw first of all and they have used it very effectively there for some time for the shot and discus. Having had it for the hammer, they experimented on wet days with the shot and discus and I think that the opinion of the coaches in the east and northeast is drifting rather rapidly, for the weight events at least, in the direction of hard surfaces. You all know the values and advantages in terms of holding up in wet weather, care of the take-off materials, etc., and you also are aware of some of the problems which would arise. But in the weight events, at least, the coaches seem to be drifting very rapidly in the direction of hard surfaces. Bill, did you have a comment to make? (Easton) Nebraska also has a high jump take-off of macadam. (Doherty) Yes, that's correct. In the northeast, however, as far as I know, only the weight events. We have had some discussion in the east in regard to this matter and although we haven't done anything, we are likely to move in the next few years in this direction. Speaking for Penn and the Penn Relays, we're prepared to put in some kind of macadam surfaces the moment there is agreement among the coaches as to the proper materials. Obviously we don't want to experiment, put something in and then tear it out, but as soon as we reach agreement as to what is proper we are prepared to put it in and if that is done in an event of that kind, there are likely to be others to follow. I have been in touch with a very large macadam outfit in Philadelphia, one of the largest in the country. I have talked with their research people and they feel that they can provide the materials, that they can answer the problems that we posed for them, the problems of temperatures, of care, etc. It seems to be agreed among our coaches that we do wish to continue to use indoor spikes, very short indoor spikes and it is not our thinking that we will end up with rubber soles, shoes, or something similar. Therefor we do want a surface which will permit a spike to enter to a certain extent. The particular reason why we have asked Dave Rankin to talk to us today is because of his efforts in the last few months to do something of this kind at Purdue before putting on the Big 10 Conference meet there. He will go into that immediately. Ed Weir has done a great deal of experimentation in this regard. I don't think he put in that high jump take-off without a great deal of thought and experimentation and he could undoubtedly make a great contribution to us at this time. Percy Beard has been very much interested and has done some writing on the subject in the last few years and undoubtedly Percy would have something to contribute also. But keeping in mind the many subjects we wanted to cover today, we thought that we wouldn't set up a panel at this particular time, but rather to ask one man to talk on the subject. It might be at our June meeting, if we feel the subject is important enough, that we could set up a panel and perhaps go into the subject a little more deeply than we will at this time. Dave has done some research work in regard to materials as well as coaches' opinions and we feel that he is very well qualified and will have some very worth-while material to give us.

MACADAM SURFACES

Coach Dave Rankin, Purdue University

(Rankin) Thank you, Ken. For this material, I sent out letters to some of you, some of you I didn't have a chance to. The one thing that came out of it was the direct opposite of what I thought would happen. I thought that the older coaches would say no because of established reasons of records, etc., but it turned out just the opposite. The few objections I had came from the younger coaches. I was going to pay credit to Ed Weir as Ken did, because of his experimentation in this. I also found out what some of you thought who had competed at Iowa and jumped off of what was left of Bresnahan's primarily asphalt binder take-off. Of course Cretzmeyer's objections to it were based on the difficulties they had with that type of asphalt. I wrote to Ed Weir and also talked to him about the formula he and the man from the city department had worked out as to the composition. The formula consists of blow sand, plaster sand, stone dust and asphalt cement with a definite penetration value. The penetration value is best described as the bleeding quality; all of us who drive cars know that asphalt bleeds. I noticed the heat out at Lincoln; it got as high as around 104 or 105 out there which probably made the temperature on the asphalt somewhere around 120 degrees but at no time did I see any disturbance in the asphalt Ed had there, no breaking down of the material. So I didn't think we'd have any trouble since we don't have that type of temperature in our climate. - - -

We thought of this material in terms of spikes and this composition has nothing in it which wouldn't allow spikes to penetrate. And as I told you, the penetration value that Ed has worked out was for the purpose of holding a firm surface and not allowing it to become sticky under extreme weather conditions. My problem, the same one that all of us have in the midwest and probably many of you in the east, is that the early springs are wet and half of my men are inside working and the other half outside and last year we were quite late getting outside at all. My idea was to find something that was an all-purpose material and at the same time to lick the maintenance problem. In some of the research letters I sent out that was one of the main things mentioned; the coaches thought it would be fine because of the easy maintenance. Even though this is still in an experimental stage, we are hoping that

maintenance will be on a yearly basis, that is, that the material will hold up adequately for a year's time. I got the money to go ahead with the whole picture because I thought we'd put it in all at once and use it as a test to see whether it was going to be advisable to use or not. We covered 3335 square ft. with this special formula I'll tell you about; this included the broad jump area, a runway of 8 ft. by 150, the high jump semi-circle with a 25 ft. radius. One of the objections Ed had out there was that the radius of the high jump was not large enough. That was something that came out of the research. So we increased it to 25 ft. which will permit the last four running steps on the mat. The shot put area we made 12 by 30 which will allow us three rings, two practice and one for competition. The discus area we made 12 by 24 which gives us two rings, one practice and one competition. The pole vault area is 8 by 150, the same as the broad jump. As I said, this area covers 3335 sq. ft. When we actually started on the project, the first thing was to arrive at what we wanted as a permanent grade, in other words, to correct the dips you may have in your field; this is the time to do it and save later expense. We started with an eight inch depth up to the finished grade and the reason we did that was to allow a five inch crushed stone (we used a No. 3 crushed stone) base that would help in the freezing and thawing period and give us a good base for the asphalt. We cleared out the cinders on our runways and made the whole area, each area has an eight inch depth. As I said, a five inch base of No. 3 crushed stone and then we used a two inch coating of asphalt binder which is Ed's idea. In other words when I talked to Ed about the crushed stone and stuff, Ed's idea was a two inch binder, his is macadam, the general base of macadam that you see that had gravel in it about so. Just as a surface to put the asphalt formula on to. That was two inches; then we ended up with the inch of formula mix to put on the top. Actually we arrived at a little more than an inch. We used an inch as a minimum figure because of the fact that if you tore it up or something we wouldn't have to tear up the top as we would if there were only a quarter of an inch on it. We wanted to give it ample depth there and we ended up with probably a little over an inch. Just to give you a rundown on a few figures: we used 93 tons of the crushed stone at \$1.50 a ton. This doesn't include transportation, just the actual cost. We used 44 tons of the No. 2 asphalt binder and 22-1/2 tons of the formula mix. The asphalt binder, I am assured by the men who made it, you can get for \$2 a sq. yd. put down anywhere. The formula we had mixed up ran about \$1.57 per sq. yd. The labor and material, I figured, should run us about \$1660 but we ran into some trouble with the labor so it cost us a little more. The difficulty came from us not paying enough attention to what they were doing. I'll include these difficulties in my final report so that any of you who are interested in getting similar work done won't run into the same situations. Now one of the things we did, we overlapped all the areas except the pole vault and the broad jump. We overlapped and came back and cut it off with an air hammer to make it nice and trim. Then we filled the dirt up to it so that it looks nice. If you get into rollers, etc., they'll knock down the edges and they won't be as you want them when you finish up so we overlapped 3 or 4 inches and when we came back and cut it all off with an electric hammer it looked very neat. In the matter of the time element, each coating we did, the crushed stone as a coating, the two inch asphalt binder as a coating and the special formula mix as a coating could be done in a day's time over the area I mentioned. In other words, you move in in the morning and by the time you move out in the afternoon this one day's coating could be done. So if you move right, it would take three or four days to have the whole thing done, that is, after you have the holes to the eight inch depth I told you about. The actual project itself could be done in that short time. And it has to be done in a short time when you're working with asphalt and that sort of thing. We got into a mess late one afternoon when they cut the thing off and we had an awful time trying to bind the two things together; this happened to the finish coat. The best thing to do is to talk over your problems with the man who is going to do the work and if you can get him to understand your problem you can save quite a bit of money and end up with a beautiful surface and avoid the errors we made. Of course the hot weather is necessary to put this down; the special mix came out of Indianapolis at 435 degree temperature and we worked it there on the track for an hour or two and it was still so hot you could hardly handle it but once they got to fooling around and it lay around in the truck and got hard so we had to throw it out because we insisted on a nice even mix. This is just one of the problems that come up but you do have to put it down in hot weather so you can work it.

In putting the high jump area down we tried to conform strictly to specifications. We were thinking of the Davis dispute in reference to the height of the bar. We were very careful that the take-off height was the same all over; I think we went out about 8 or 10 feet so that there would be no dispute about the take-off and the height of the bar in case of a try at a record. I think that we covered as much area as anyone would want except possibly for the javelin and the hammer. Remember this is still at an early stage because we didn't get the surface down until a little late in the fall so we haven't had time to really experiment with it. I have written people telling them I'd be glad to give them all the information I gather but I'd like to reserve that until we can go through a period, maybe next spring or next summer, when we can try out its possibilities, see what problems we run into and then do what I can to advise you. When you're going to take your own money and put it into a thing like this I'm sure you want to be sure

of what you're going to do. I stuck my neck out and said I was sure of what I was doing so we got the job done and I hope it turns out right. As I said, we planned some fall tests but because of the lateness and the cold weather it was too late to do much with it. But we did find the friction surface satisfactory. If you were to go out and look at it you might say there isn't enough friction there. We did experiment a little with the pole vault and the shot put with rubber-soled shoes and it worked very very well. There's enough friction to serve your purpose. We took a couple of workouts in the broad jump and high jump just to see how the rubber-soled shoes would do and it worked fine as many of you found at Nebraska last year. So I think you would have a choice and with the exception of the broad jump and the high jump you could eliminate spikes if you cared to. Rubber-soled shoes will save the macadam but you can use the indoor spike; the formula was designed to take a short spike and it will absorb it. It will take it at temperatures pretty close to 45 or even 42 degrees, that is, the temperature of the asphalt surfaces. The day could be even colder than that. We did quite a lot of running on it, back and forth, stopping and starting and it leaves a hole like a good indoor clay track. You just see the hole from the spike and that's all. I don't think we should abuse it and try to use longer spikes but it is my opinion that the board spikes will serve the purpose. The penetration is adequate at the temperature range you would run a meet on.

Now here are some problems we ran into. One is the fastening of the rings. We made our mat larger so that we could move the rings back and forth if any spot got bad. I don't know how much of a problem it is, but I haven't thought exactly how I'm going to fasten the rings down. Another one I hadn't thought much about until it came up was the installation of the broad jump board but I don't think that will cause much trouble. There is a possibility of the board working up above the base which might cause bruised heels, etc., but I think if we watch it we can just take it down with a plane. Then again, there might be some difficulty when we have to take the board out to replace it. Another thing is the maintenance and the resurfacing. As I said, I hope the maintenance is going to be on a yearly basis. You won't have too much trouble getting the material, especially if you have a highway department close by. We have a research place here on the campus; they have a small mixing machine and can probably make two or three pounds at a time for us. You can chisel out the little area that is bad, have the proper mix made, then cover it over and smooth it in. If the whole thing went bad over a period of time you can scrape off that inch surface and resurface that.

Some of you asked in your letter what would happen if the boy had to go from the asphalt on to clay? After all, our kids went from clay right on to the asphalt and found no difficulty. In championship meets they make the runways as hard as they can so that they will hold up for the duration of the meet. But if they get torn up and soft so that the kids have to move their marks up, they just have to adjust to it. The hardness I don't think is going to bother anybody. As I said, a lot of the practice can be done in rubber-soled shoes so that a lot of the possibility of shin-splints is eliminated. We did quite a bit of pole-vaulting and I asked the kids how they felt about it, whether it felt dead to them. But they said they liked it very much. One of the reasons is that it always affords a sure footing, there isn't always someone tearing up his take-off. They like that permanent base and don't mind the hardness of the surface at all. (Here someone asked about the possibility of broad-jumping directly off the hard surface.) (Rankin) I don't think you would get the same take-off value that you would off of board. And I think the rules call for a take-off from a board so you can't use the ribbon.

(Doherty) May I ask how many of you feel that you have important questions at this time? We're just about 15 minutes behind schedule. Suppose we take all the questions at once and we'll try to pick them up. (Q) I didn't bring a compounder with me so I don't know about the cost in square yards. What's your overall cost? (Q) What is the formula mix? (Q) How about using the hard surface on part of the runway? (Q) How about records?

(Rankin) I went to my athletic director and asked for \$1800 and he asked me if it was going to be all right. Then I got to thinking about the possibility of some of my young friends coming up with objections and going to the rules committee and getting the rules changed and me ending up with an \$1800 job I'd have to tear up. And looking for a job at the same time. So I wrote to Brutus Hamilton and he wrote to Elliot Noyes. Of course I had looked through the rules and I supposed Ed Weir did too. It will stand up for international records. The international rules do not specify take-offs, only the Olympic Games do and we don't expect to hold the Olympic Games so that let's us out. Overall costs? I'll be glad to give you the figures afterwards. As I said, 3335 square feet at the thicknesses I gave you ran about \$1800. I have it worked out per square yard and I'll be glad to give it to you. My idea was that this is an experiment and I'd like to complete it and then write down all the problems we faced for any of you who are thinking about trying it. When I'm finished, I'll be glad to send you the complete works but if some of you want to go ahead in the meantime I know Ed will be glad to send you what he has. Part of the runway? Do you mean making half of it one way and half the other? (Q) The runway in the broad jump and pole vault, just the last three or four steps. Just put those in and use a fairly short spike. (Rankin) That has been brought up before. I think perhaps you might have difficulty in the run. One

part will tear up and the last part stay the same. As I said, one of the things the kids liked about it was that the run is primarily always the same. After the meet goes on it becomes slower and gets torn up so you have to move your marks up. I suppose you could try it but I think you would have the same difficulties you have now.

(Fred Tootell) For those of you who are interested, I'd like to volunteer some information. I haven't seen this other surface so I don't know how it compares with what I did some years ago. I've had a high jump take-off and a broad jump runway in for ten years. Now this is all that I did. I took off the top six inches—remember, this all depends on the climate. I'm in a comparatively mild climate next to the seacoast so we don't get as much frost as you may get in other areas. I also have a soil that has a great deal of gravel in the base which aids the drainage, so I just took the top loam off and filled in with gravel and then, being Scotch, I took an old concrete mixer and got some screened cinders. I put in six shovels full of the screened cinders and mixed it with water. Then I added one part of asphalt highway emulsion on the same principle. With the water being added and this being mixed up and churned around till it's well circulated in there, you can just pour it out and level it with a regular flow and it doesn't cost you very much. The asphalt highway emulsion costs you about \$18 in a 55 gallon drum and the proportion is about 7 to 1. Then you just flow that on; you put it on 3 or 4 inches thick, which is what I did. I suppose you might try different levels. As they told you, you use the short broad-track spike on it and it works beautifully. I had the first one the kids used; I have both the clay runway and that one and that has been used for about ten years now. The only upkeep I have had on it is those small holes you speak about. I'm still Scotch and in the filling in of these holes I just took some of the same asphalt highway emulsion, poured some water with it and then threw it on the runway and then threw a little screened cinders on top of that, just brushed it in and filled up the holes and it looked just the same as it did before. That doesn't cost much, particularly if you have a few men around who are good at a concrete mixer and you don't have to look around for 1600 bucks. I don't know about you but to me it looks like quite a lot of dough. Mine works quite well and it's been very satisfactory and cheap.

(Rankin) I might add to Fred's statement about the emulsion; the emulsion is the same here as it was in your case. It's just the penetration value in the formula.

(Doherty) That's a very valuable contribution. I might suggest in the first place that this is more in the way of a preliminary report rather than a final one. The June clinic will be held along with the National Collegiates. Can any announcement be made on that at this time? (Easton) They tell me the date and place have been set; the University of Michigan at Ann Arbor on June 11 and 12. You should all try to be there; you'll see some great track as well as a clinic of this nature. (Doherty) We had in mind that at that clinic this subject of macadam surfaces should be brought up again and perhaps discussed at greater length. So Dave, if you'll bear it in mind that this is the first of a series of two reports and others can join in the discussion. The AAU meet will be held in St. Louis the following week, I presume. A quick question? We're running overtime. Again, those of you who want to, stretch for 30 seconds. - - -

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(Doherty) We have already had a couple of hours or so and the enthusiasm usually dies off toward the end. This panel has already talked among themselves about how they were going to say the things they want to say in as short a time as they possibly can. An hour and a half has been set aside for this distance running discussion. The panel is going to do its best to see if they can say all there is to be said in 30 minutes. I think they could go along a few minutes beyond that if necessary. We're scheduled to end this particular period at 5:30, then to get together this evening at 7 o'clock. Then we'll have a discussion on starting, then a panel discussion on hurdling with loop films again which I know is going to be very worth while. And we do have the 1952 Olympic films which will be shown at the end of that period. We feel that the clinic ends with the hurdle discussion but everyone is invited to stay over for the showing of the Olympic movies. Information, questions, etc., have been tossed back and forth with this distance running panel over the last few weeks. We have agreed that our efforts will not be pointed at telling what a particular individual does in his training methods, or a particular coach does in a particular event. We agreed that our discussion should be of a general nature and an attempt to draw together what the panel considers to be the fundamentals of training in distance running. I assume, though there has been no discussion, that the distances to be considered are those of two miles and under, (not the longer events) i.e., the half, the mile and the 2 mile.

The first man I want to introduce is Dick Lacey, highly successful distance coach from Pelham High School in New York. He's come all this way for the specific purpose of contributing to this panel discussion though he has nothing at all to do with NCAA track meets. You have probably read some of his excellent articles in the *Athletic Journal* and the *Scholastic Coach* magazines. Last year, on his own, he went over to Finland because of his tremendous interest in distance running as well as in track in general. His article on "Improvement in Distance Running in America" I thought was one of the best

I've seen from high school coaches, or college coaches either, for that matter. The second man, George Rider, needs no introduction. You all know the tremendous contribution he has made to this organization. He is also the prime mover in the fine organization of high school track and field coaches in the state of Ohio. Needless to say, he has had fine distance runners and cross-country teams for many years. Chic Werner, now, his great claim to fame, and it is a real claim, in my opinion, is that the greatest percentage of the glory for Horace Ashenfelter's victory in the 3000 meter steeplechase belongs to Chic. But besides that he has many other reasons for pride. He has been an assistant Olympic coach, and there are the marvellous distance runners he has had since he went to Penn State. He's up there in cross-country every year and he's had some one up in the Collegiates almost every year. This is our panel.

The first question which was sent to the panel by mail is, "What are the essential elements for training for distance running?" We're going to ask each member of the panel to comment with a limit of possibly two minutes for each and a general discussion to follow that. Dick, as guest of honor, would you like to open the discussion?

PANEL ON DISTANCE RUNNING

Dick Lacey, Pelham H.S., N.Y., George Rider, Miami (O) U.,
Chic Werner, Penn State U.

(Lacey) I don't think I'm the guest of honor when I'm up here with two such celebrated gentlemen. I'm speaking principally from the high school level. I don't know how many are high school coaches here. (Show of hands.) I'm glad to see that there are quite a few. I'd like to preface my remarks that what I say is only what I think. I don't know whether I'm right or not. To me the one essential for distance running and this goes for high school or college, is to run, run and run. George Eastment isn't here today; I came down on the plane with him but he's at the NCAA meeting. But for many years I've remembered a statement he made (I don't know if it was original with him but he often quoted it) and that is that good running is an accumulation of a lot of running. I think that's particularly true in high school. I used to think when I first started coaching some years ago that one shouldn't run a high school boy too much. I've gradually become more and more of the opinion that the more he runs, the better he probably is going to be. I believe that the big mistake that high school coaches make, at least in our area, is that they have cross-country in the fall and then in the middle or perhaps late in November they stop and do nothing more until the spring. Spring comes fairly late in our parts so often they don't get outdoors until April. So those distance runners have lost their entire edge, are all out of condition and have to start all over again. For a good many years at Pelham we've kept them running all winter. Of course, around New York you do get some meets in winter so we do have that incentive. But even if we didn't, I would still keep them running. Yesterday, and by the way our school numbers about 200 boys, we have a fairly limited enrollment, yesterday, for instance, before I left, we had 50 boys on the field working out, a good many of them distance runners. I think the only way for a high school boy to be a good distance runner is to run and run and run. I'm going to stick my neck out and some of you may not agree, but maybe later I'll tell you a story which will illustrate my point. I think that if a boy runs and runs, no matter what he runs or how far, just a certain distance every day, he will eventually get to be a pretty fair runner even if he doesn't have too much coaching. Of course it helps if you are there to direct him, to see that he gets the right amount of speed work, pace and so on. But I'm more and more becoming a great believer in that run, run, run. All of you know, those of you who play golf, bowl, play tennis or anything else. If you want to be a good golfer you have to play golf all the time. Look at the professional golfers. If you want to be a good bowler you have to bowl all the time. These fellows who bowl 300 games on television bowl probably every day of their lives. If you want to be a good runner you've got to run. That's the basic principle, as I see it. Without going into too many technical details, Chic and George here can probably tell you more. I'd like to come back later to tell you this one illustration I mentioned which I think brings out that point pretty well.

(Rider) I'd like to lead off by suggesting a couple of things that are essential to any good distance runner. I don't think any one will ever become a good athlete in any sport, a good runner, unless he is motivated in some way and has a keen desire to be good. I don't know of anyone who ever developed into a good runner who didn't have the keen desire. Then I, as a college coach, want to know the boy's high school background. If I could get a few of Dick's distance runners I'd know pretty well how to start out. He's had remarkable success and I'll go along 100% with his principle of run, run and keep on running. Now, a second thing that's essential for developing a good runner, that is, a good racer, is for him to learn to distribute his energy over the distance that he has to run. If he does it as efficiently, as economically and as fast as he can, he will finish strong. That requires another factor in training, and that's pace work. We do a considerable amount of pace work at different distances. I have

one other thing that we do a great deal of and in recent years I've emphasized it more and more. I think every year I get to the point of emphasizing it a little more and that's an awful lot of speed work. We do it in different ways; shorter distances than the race they're going to run, sometimes run them in relays and when that is done I think you have to be pretty careful to line the boys up so that the poorest one isn't running against the best. It's alright to do it once in a while but a poor boy, a beginner, gets very discouraged when he runs against a boy who is a lot better than he. Line them up, in relays in particular, so that the matched boys are somewhere near each other in ability. Match them up in pairs, in quarters and halves and three-quarters or 220's and let them keep on going until you think they've had enough. So, endurance work is highly essential, we do a considerable amount of over-distance work; we'll double the distance they're going to race or even triple it on certain days. And so, run all distances and do a lot of running, a lot of speed work, pace work and some over-distance work. In over-distance work in the last few years we've used "Fartlek" methods, speed-play as it's sometimes called, where the boys go out and run for fun and do speed work at the same time, in other words, easy and relaxed and have a good time, then go right out and sprint for a ways, 220 yards, 100 yards, depending on the time of the season and how much work they've had. Without going into schedules, we do most of that on Mondays.

(Chic Werner) I agree with everything that has been said. A little different approach to distance running may be this. We look upon distance running as involving two aspects. In distance running at one or two miles the boy must recognize that one of the obstacles, perhaps the biggest one, is the overcoming of fatigue. We try to teach our boys that there are two types of fatigue, mental and physical. The physical fatigue is the one they can overcome by maturing or by hard work, running day after day after day. We use the golf club a lot principally for warming up. As a matter of fact, during the track season our whole track squad including the weight men, runners and jumpers all go over to the golf course which is about 3-1/2 miles, I'd say. Usually the non-distance runners are reluctant, of course, but we usually have the whole squad working out there. I don't care how slow, even if they walk; I know there's some benefit comes from it. This all happens before work-outs. I look on that mental fatigue as that fatiguing thing that wears you out. I think that you can recover from mental fatigue almost instantly. I think we've all had examples of that; a boy who's finished a race and is staggering and wobbling all over the track and you know darn well that he couldn't take another step. He gets his time and if it's favorable he starts jumping up and down and has all the spring in the world. The same kid who is absolutely petered in the race, he's a dead duck and has every feature of a cemetery in his face, if the fellow who was ahead of him wasn't ahead of him due to some mishap, why that kid comes to life so fast—well, that's mental fatigue. I consider physical fatigue very very rare. Now we do an awful lot with our boys by letting them know that this thing is artificial. A good example which most of you can recall is how reluctant most boys are to run doubles. Every one of them will tell you after the first race: "Coach, don't forget I've got a mother and a father. Let's not make me win this track meet alone." He'll be surprised when he runs that second race and it's better than the first. It always comes out that way and after about two or three of those he gets almost eager to double.

(Lacey) Just one more thing for the high school coaches because their problem is different. Of course the college distance men do keep running all year while some of you high school coaches, particularly in the middle west here, have fairly rugged conditions in the winter. I think you just have to do a selling job on your runners, not only the distance men but the others too, if you can get them out. Even if they don't compete, just sell them on the idea that if they do come out and run all winter, even if it's only two or three days a week, that when the spring comes they'll have such a jump on their opponents that their opponents will never see them, those of them that start running in March or April. Even if you have to have them inside in a hallway in school, running in place. For the last two or three years some of my fellows have told me that they have had some of their best workouts this way. We'll go down in the lobby between two gyms (we haven't got a gym because the basketball teams always have them) and they will run in place. I'll hold a stopwatch on them and say for two minutes I'll tell them to jog and they'll run up and down just about the equivalent of jogging and then I'll say "O.K., sprint!" then for about 30 seconds or maybe a little less, the equivalent of a 220 or so, they will speed it up. Then I'll say, "Good. Now slow it down and jog again." We do that for 10 or 15 or 20 minutes at a time, then rest and maybe go through the same thing again and they get practically the equivalent of a full scale workout outdoors, believe it or not, and they don't mind it. You wouldn't want to do it every day but if you're driven indoors you can do that. And even if you have snow; you'd think a kid wouldn't want to go out and run in the snow and the cold but they get a big kick out of it and you can sell them on it, at least I have in Pelham, by building up the idea of, "Well, you're the rugged fellows, you're really rugged. You can get out there and show them." And they like that. They like to have people comment, "Look at those fellows out there in the snow. Are they crazy or something?" They can talk about it so if you can sell them on running all the time, you're going to have some good distance runners in the spring.

(Editor's Note: The following reel was very badly recorded and there was some difficulty in getting everything that was said.)

(Doherty) We have had a question from the floor on this matter of running off the track. Don Canham has an interesting point of view on this, I understand. There's this term "fartlek," speed-play, which is done primarily off the track. The question is whether any kind of running off the track is worth while and to what extent. Chic?

(Werner) I just got through mentioning what my boys do for a warmup. Absolutely before their assignments. They cover the cross-country course of 2-1/2 miles. (Q) Do the shot-putters do that too? (Werner) Yes. Everybody. I recall being criticized for taking the spring out of Ewell; I had Gehrdes doing the same thing and he was a 9.5 man. But I don't think too many of us are sold on that yet. I am. I think that distance runners should be strengthened; it just goes back to my idea of physical fatigue which can be overcome by work, work, work, run, run, run. It doesn't have to be in the assigned work-out. Now I recall in Helsinki a few incidents that took place along the fartlek line. As I recall, fartlek as a workout means nothing but running in the woods or around the countryside which is something other than a cinder track. I think that most of the American distance runners who are of a caliber to make the Olympic team are well aware of the principles of fartlek. We were very fortunate last spring that we had a distance runner who made the Olympic team from our school; the boys proceeded to find themselves a track in the woods to work out on. They did this in the morning. There was Browning Rose first and gradually most of the other runners on the Olympic team started going with him. I think that McMillen was reluctant at first but he went with them, and Barnes went with them, and they simply jogged through the woods. These woods were of an old nature and there were plenty of pine needles and it was kind of spongy. Some of them might have said, "What a heck of a thing to have to do, to come from that over to the hard cinder track." Nevertheless, it didn't seem to hurt them any. I think they do that at that stage with no idea of improving their reserve of strength, but just to maintain an interest. It's fun just springing along in those paths. Now that's something besides only running on a cinder track. Is that what you had in mind?

(Rider) I'll go along with Chic. I think we spend on an average of seven-tenths of our work off the track. We're situated so that we have a golf course with starts and finishes at the back door of our gymnasium and the boys come out, get dressed, and go around that golf course before they come out on the field. Ours is about a mile and a half or thereabouts and there's a hill in it. Down and up. They go all the way and that's their limbering up. They take it as easy as they please; I don't watch them to see how fast they do it. And their wind sprints; we do a lot of them. They are always done on the infield, inside the football field, inside the track, in rubber-soled shoes just like in cross-country, crepe-soled shoes. The only time we run on the track is for speed and pace. I'd rather have them do most of their work on the grass and we rarely have any leg trouble. Shin-splints we very rarely get. We used to have plenty of them because in early practice we had to run on a road. We don't have a field house but in rubber soled shoes they get along pretty well. I like the idea of running on the grass and we're fortunate in having a cross-country course which is on our golf course. It's all nice turf. We do a good share of our work on that and of course we do our speed-play on that. We go on the track for relays and speed work but seven-tenths of our work is done on the grass.

(Lacey) I'll go along with that on the high school level too. Up to about six or seven years ago in our school we did all of our running on the track. Then I guess I read about it or heard about it somewhere, this fartlek or speed-play, so I started to experiment with it in the winter and then carried it over into the spring. Of course you never can tell whether it's coincidence or not, but in those six or seven years our times, our records and our performances in distance running have improved tremendously. Again, I'm not sure; it's only what I think, but I'm sure it's due to that. In the spring, for instance, we've more or less been driven to it; necessity has made us do it. Up to this year—we're finally getting a track of our own—but up to now all the track work we do we've had to do on a track belonging to a neighboring town. It happens to be near enough so that we can go to it, so for the last six years or so we haven't been able to get on a track very regularly, our milers and half-milers, and we even go down to the quarter-milers, we have them run off the track, a sort of cross-country type of speed-play work sometimes two or even three times a week, particularly the veterans, the seniors and those who have run before. I'm now trying to train the younger fellows, the 9th and 10th graders, in how to run that way and I've got a lot of 9th graders out now and am starting them. I mark out a 220 course on a dirt field in winter and try to get them into the routine of it by standing there and telling them how much of the time to sprint, then jog, then sprint, then go off and in time they can go out by themselves and regulate their own workout. You might be interested in this; it may be only coincidence but I don't think it is. We have a small school with about 200 boys and there's a good deal of interest in track. In 1947, when we started doing this, our school mile record was 4:45.8 which isn't anything to write home about. Incidentally, I don't consider myself any authority on distance running.

Now since then, that was 1947, and I don't think that in the six years since then we've had any better material though it's been fairly steady, in the six years since then we've had eight runners who have gone under 4:45, we've had three others who have gone under 4:40 including one under 4:35. In the half-mile, in 1947 our school record stood at 2:05.2, again nothing very wonderful. Since then seven boys have run under that time and two have run under two minutes. I'm positive myself that the improvement is due to that kind of work and in case you wonder about high school boys doing it, they love it and they'll work harder that way. I remember back in the days when we used to stick to the regular routine kind of work, on Monday a mile and a half, Tuesday a couple of halves or a paced 300 and so on, each day a cut and dried schedule of distances to run, usually on the watch, they'd often come in pretty tired and sometimes feel discouraged. This way they work much more and they feel good when they're through and they get both the speed and the endurance. I think that it's the coming thing, that the high schools can use it as much as the colleges.

(Rider) Ken, may I add just a word here? I think you fellows all realize the fact that probably the reason that we have such good runners is the coach's enthusiasm. There is no substitute for it. Enthusiasm of the coach for the event or events. You aren't going to get the kids coming out and begging for it. (Question from the floor to Lacey.) How many months do you have your boys run? (Lacey) Nearly all the time. I don't like to have them running so much that they get sick of it. When they are, they tell me about it; I get to know the boys pretty well. After cross-country we usually tell them to take a couple of weeks off. Funny thing there, though, once you get a boy sold, many of them don't want to do that. They come out anyway; they just don't want to get out of shape. Then through the winter we enter a few boys in meets, in the New York area there are quite a few meets where they can run, but we do it mainly for conditioning. I don't put any pressure on them. I tell them we're going in for conditioning purposes, if we do well, O.K., but if we don't that's O.K. too. I don't think it would be good to put the pressure on them. If they have that all through the year it might be bad for them. In the winter—occasionally if I get a very good boy I might point him for one of those races if I think he can do well. The competition does give them a little more incentive but at the same time, if they don't do too well they don't feel too bad about it. They know they're getting ready for the spring.

(From the floor.) Ken, I just happened to think of a story you told about mental fatigue. Weren't you the one who told the Metropolitan coaches the story about Campbell Kane? And how he won the mile and the half-mile in the Big 10? Tell them that; that's one of the most remarkable stories I've ever heard about this mental fatigue business. (Doherty) The story is about Campbell Kane of Indiana, 1941, I believe was the year, who won the mile in the time of about 4:14.4, pretty fast time for that period. He was trying for a record, he indicated at the time; he tried to run all out most of the time and there was enough competition to keep him going. Afterward he obviously was definitely tired. The half-mile was scheduled for 40 minutes later and Campbell, talking with Roy Cochran, told him that he didn't think he'd be able to come back. But at the end of the quarter, there happened to be three Michigan men out there blocking him off from going out in front. There was no intent involved, of course, but that's the way he saw it at the time. He must have thought, "I'll get those damn Michigan men." His thoughts were fixed on the necessity of licking those guys who were using unfair tactics so he pulled up to the front with Breidenbach and the two men, running all out on the final straightaway, neck and neck, well, I'll never forget that picture. So he came from behind after having run 53 seconds for the quarter and won by a chest. The end of the story is that he felt so good after the half that he asked Billy Hayes if he could run the relay and he did his lap in under fifty seconds. The question is, "When was he tired?"

(Editor's Note: Here the tape becomes completely unintelligible. When it picks up, Doherty is talking:) - - - a certain pace, a pace that was faster than he would normally run for a mile. But the important thing is that he always observed a certain definite rest period in between these 330 yard dashes, but again, the length of that rest period was in effect just as important as the number of 330 yard dashes he would run. We might run, let's say, a dozen 330 yard dashes, or quarter-miles, or whatever the distance might be, and not pay any particular attention to the length of the rest periods in between. But you'd have no way of figuring how much improvement has been made.

(Werner) We have these various types of workouts, ins and outs, fast and slow and slow and fast, breaking up the monotony of the workout and building up resistance to fatigue. Now in the room here I see Les Eisenhart, Tommy Deckard and a few others who have been very outstanding among our distance runners. It makes me wonder, what did these fellows do that the average distance runners couldn't do? I know one thing you have to do to make a distance runner, aside from conditioning, and that is to make him reckless. The runner must have no respect whatsoever for ordinary times. If a boy has been a high school runner whose best time is 4:45, you should be talking and making him think in terms of 4:40. In college it's the same way. You have to be careful as a coach to consistently pat the boy on the back when he reaches the next low, but to refuse to accept that as the ultimate. As soon as the kid reaches the mark he's been striving for, you congratulate him and then say, "Well, Bud, you know that this isn't it." The poor devil can never get ahead of you as a coach, but that recklessness is

what makes a great distance runner. I recall one time, it was in Madison Square Garden, and I think it was Wilt, Bill and Horace Ashenfelter and Curt Stone. Anyway, these fellows had been working out together and they asked me if I wouldn't set up the race for them; they would have one of them go out and set it and the rest of them agreed that they would follow the pace. They thought they could break the world's indoor record. So I set it up with the mile and a half a little bit faster than they had ever run it. Well, that would have been enough alone, to say nothing of going on to two miles. I think it was something like 6:33 or maybe 4 or 5. They didn't think much of it but finally they said, "Let's do it. We don't care if it is Madison Square Garden. Let's get reckless; we'll do it that far and if we all reach the point of fatigue so thoroughly that none of us finishes,—but I don't think that will happen." Well, they sucked Bill in to going out and making the running and he stood it for maybe a mile and a quarter right on the nose, and they all stuck right with him. It wasn't one of those things where they let the sucker do the work and they'd win at the finish. They were determined. As I recall it, Bill was completely washed out at about a mile and a half, but the rest of them went on. I think one of them broke the world's record, that was Wilt who ran 8:50.7, Ash ran 8:51.4 and Stone was 8:54.4. Well, that's a respectable two miles, to say the least. When it was all over they came over to that little corner of the Garden where the coaches all sit, and voluntarily, while still breathing hard, this was in the first lap of recovery following the race, they didn't even know they had broken the record, one at a time, not together, they told me that was the easiest race they had ever run. When you get so reckless that the point of finishing is immaterial, when you don't even have in mind what happens to you or what happens to the other fellow, when you have no respect for time, then you've got a champion. That fast pace, when you get into it, is all right. But you have to keep your mind off it. If you keep thinking of it it will get you down. (Doherty) I think that point is very well taken. Chic has written it up in what I think is one of the best articles ever written on American distance running. It's in the minutes of one of our coaches' meetings, I think it was in '52. Are they still available, Bill? (Easton) They sure are. For how much and where? \$1.50. Just write to me. (Doherty) It's an excellent article in which Horace Ashenfelter, the Olympic steeplechase champion tells that wonderful story. It's one of the finest we've ever had and he gives Chic credit all the way through. Chic asked the boys the question, "How fast have you ever run the mile and a half?" Their answer was, the story says, 6:35. Then as the story goes, Bill Ashenfelter ran the mile and a half in 6:38 and they just kept on going. Any comment? (Werner) I was going to ask Tommy Deckard if he can recall an incident or two where his recklessness paid off. I think he's gone. How about Gil Dodds? Gil, I'd like to have your reaction to the point that has been made. I can remember several times when you showed recklessness. I'd like to hear what your reaction is.

(Dodds) I'd just like to say that the only way I ever ran my races was to run the three-quarters as fast as I could, hoping I could hold on to the last. I remember one night my coach told me to go out and run the three-quarters in 3:01 hoping I could hold on. I ran the 3:01 and staggered in, I think it was around 4:07 for the mile. I feel, as has been said here, that the only way to be able to run fast times is to be reckless. I think that's the only thing that prepared me for the harder races because if I hadn't punished myself with the ability to stay in there, I would have been a little scared of it in a way and I wouldn't have been able to punish myself with all that is necessary to hold on. Now as far as the mental fatigue is concerned, this is one way I found that I could run the fast times, especially indoors. In the last race I ran in Madison Square Garden, I ran the first lap easy but fast enough to get out of the way. Then I scooted down the back-stretch where the half was, then I'd say just two more laps to the half. I'd just run it in sections like that. I scooted around to where the three quarters was and I'd say two more laps to go and after the three quarters I'd say two more laps to go and after I scooted to the finish line I'd say two more laps to go and when I heard the bell I'd say I've fooled myself long enough, I've just got one to go. Psychology is a great factor in distance running; you have to punish yourself, but I think that recklessness is one of the greatest things a distance runner can come to learn.

(Applause.)
(Doherty) I wonder if there is any contrary opinion from Bill Easton on the subject of his boy running the first half of the race a little more slowly than he might be able to run it, or perhaps something on the advantage of speeding up the last half of the race, the tremendous emphasis he is putting on the last half. Do you have any differences with the point of view that has been expressed here?

(Easton) I think just about everything has been said about distance running. Your panel up there is too darn well qualified for me to add much to the discussion. The way we think about running the mile, Wes and myself—(Excuse me, Bill, would you mind coming forward so that we can get this on the tape? We want to know how he's going to do it.) I just want to tell you how we are thinking in our minds how Wes, we hope, will be able to run the four-minute mile. As you know, at Compton the race was run with a very slow first half, then we took off and ran a 1:57 last half. Every race where he has run under 4:04 has been run just about like that. Our original idea was for him to run as frequently as possible after his great performance at the Drake Relays, a few years ago, as near to 4:07 or 4:08 as he

could get. Then last year we moved that down to the level of 4:04 to 4:06, hoping that as he runs, he will gain the thought that it is easy and that he would be able to do it as many times as he wishes. His workouts have been no different than anything that you've heard here today. They have been almost identical with the old Hayes theory of over-distance, followed by pace, followed by speed work. That's been our theory for these long years, and incidentally, there's nothing new that's been said here that Billy Hayes didn't already know and already do years and years ago. He knew all that; where he got it I don't know. So, last December 31 in New Orleans at the Sugar Bowl, Wes ran a most peculiar race. He ran 60 seconds for the first quarter with Drummond leading, as he always does, and followed by Landkvist, the Swedish cross-country champion from Oklahoma A. and M. with Wes in third. We had done very little work for this race because this was a vacation. His second quarter was 65 seconds for 2:05. He was simply running up their backs; he was holding back and not running on his normal pace. In the third quarter Cappozzoli came up from way back and took over and picked up the pace a little bit and they ran 64 for 3:09. They crossed the finish line at 3:09 side by side as Wes moved up with him, Landkvist gradually moving back and fading. As they came off the curve Wes took off and went by and I told him to go through because Cappozzoli was hanging on pretty well. As you know, he's a great competitor for a little fellow and he's simply not a miler but a two miler but he was running the second-best mile of his life on this track which had had five days of rain and although it was still smooth, it was not breaking up, it was still wet underneath. Wes ran 55.2 for his last quarter, that was 4:04.3 and Cappozzoli ran 4:08 and a fraction for his mile on that track that day. Now people say to me, "Why didn't he go all out and run, under the circumstances, and set up the race differently?" That's the question that has been asked: "Why don't we run faster at the beginning?" Well, if you heard the talk on physiology, fatigue, etc., by our very eminent physiologist Sid Robinson, from Indiana, you will know that to go and run all out at first is just like pouring it out of a boot and you're going to have nothing left. That idea was propounded by George Rider, of spreading it out over the long distance and that's something we have to learn to do. And that is the thing that we're trying to learn now. We're trying to learn to run at a pace that will be equivalent to 4:03 or 4:05 and do it with the greatest relaxation and ease so that when the right place and the right track and the right temperature, the right competition and by all means the right crowd, a real audience to spur him on, I think the boy can run four minutes or better. Now I'm not predicting that particularly, but I do feel that he has the ability if all things are right. You will be interested to know that when he ran 4:02.4 at Compton, he had just finished a final exam. He had the day before, for four solid hours, taken a physiology examination, both written and oral; he got right on a plane and arrived in Los Angeles, went right to a hotel, took a shower, went out and ate, took a short walk, came back and went to bed. He was bushed when he got on the plane. The next morning he got up at 7 o'clock, took a walk, ate his breakfast, took a short walk, came back and went to bed. He has one terrific attribute, something I think is very essential to a great athlete—they used to talk about it in connection with Mathias—and that's the ability to relax. He can actually lie right down on the floor and go fast asleep. I was reading the paper about what Johannson had to say about Santee's ability and he went to sleep on me so I turned out the lights and went to bed. But that's the kind of youngster he is. He is credited with being very cocky and as the Saturday Evening Post had it, a very difficult youngster but he is not. He's one of the finest youngsters I have ever met. He's very easy to handle; he doesn't disobey regulations and he will absolutely follow orders on the track. After we agree as to the way a race is to be run, he sticks to it and runs it just like that. And that's the reason I think he's going to be able to do the seemingly impossible.

(Question from the floor.) Bill, I'd like to know more about what you mean by "pace"; at what level are you working in practice, the four-minute, as you mentioned? (Easton) We've never run a mile in practice. We've got a Kansas rarity in our territory; it's a hill. It's called Mt. Oread. We laid out our cross-country course premeditatedly; the hill on our course comes after two miles are run. We drop down the hill, go around the lake and come back up and it's just a half mile long approximately from the time we start until we get to the hill. We do that almost every day. We don't run the hill hard, we just do what they have been talking about here. We do work out on the course. Fast speed work we do on the flat. Now we really don't run time trials, especially with Wes. He went through a terrific summer last year in Europe and when he came back we did practically nothing except let him rest. He ran at his own will, for fun. He had no time trials during the entire fall. We got ready to run in the National Collegiate C.C. on time trials only in meets, three miles in our conference, and we did not run a four-mile time trial at any time during the fall. The first time we ran four miles was in the National Collegiate meet at East Lansing. Now I don't know if that's what you want or not, but that's the way we did it. If there are any questions, I'd be very glad to tell you anything we do.

(Q) Bill, when you put him on pace work, just what do you do? (Easton) We run quarters, as a rule. (Q) Nothing longer? (A) Very seldom. Oh, he might run a half once in a while, but it's usually quarters, continuous quarters, maybe three, depending on how fast he runs, or maybe five. (Q) When he's running like that, at what speed do you have him run his quarters? (A) If only three, he'll run 51 or 52 but if it

were five, he'll try to run 53 or 54, something like that. Remember, he can run a 47 something quarter, he's done it. What you have to do, of course, is to gauge the boy's ability and try to accomplish the workout as it's laid out. Don't make it so difficult that he can't possibly accomplish it or you will ruin the point that you're trying to make. Now Wes, you don't have to worry about him. We have to hold him back; he just loves to run. I think this point is interesting. He's going to run anyway; he dresses and runs back to the house. You'll see him running down the hill coming to his workouts. (Q) How much rest does he take between those quarters? (A) None. He doesn't take any rest at all. It's run, jog, run, jog, run, jog. He'll run a quarter, jog a quarter, run a quarter, and so on. Sometimes it might be 300; the only time I ever had him run a 220 hard he ran 22.7. (Q) How does Wes know how fast he's running on the track? (A) Well, I'll tell you how he knows. He can set a 50 second quarter, a pace quarter, and he'll hit it within a fraction either way. He has that ability. I take no credit for Wes Santee, none whatever, except to keep him from being proselyted to death. That's the one thing I take credit for. In our conference you can run in no outside meets not sponsored by a college except by very special permission. He had seventy chances to run in outside meets last year and he ran in one.

(Doherty) Bill, thank you very much for your contribution. (Rider) I just want to make one observation after Bill told us how he trains Santee. One of the most important things in distance running is to develop confidence. The way he has built him up, 4:08, 4:06, 4:04, making him believe that he can do it, that he can do better any time he tries, is one way of building confidence. One other thing, Bill said that the only time he ran four miles was at the National Collegiate. We happened to be dressing in the same room with Santee, and while they were getting their clothes off, Wes wasn't even tired. He made this statement: "Too bad there wasn't some tougher competition." He won by how much, 200 yards, 300?

(Lacey) One other thing that I might add. We were talking about pace workouts and also about this recklessness business. About a year ago I was with Bob Giegengack, the Yale coach, and he has developed this kind of workout. I've tried it on a modified basis and the kids like it a lot. He has, every once in a while, he has his milers and half-milers and even his quarter-milers try to run a four-minute mile in ten minutes. He gives them a ten-minute period. When he starts them, he says, "All right. From now on, in the next ten minutes you've got to run a four-minute mile. You can do it in any way you like, by running a two-minute half and then two 60-second quarters, or you can do it all by running it in 220's or any way you want to." He told us that when he gets a man who can do it in ten minutes, he knows the boy is in pretty good shape and he knows he's got a pretty good runner there. Of course in high school you can't do that. First we tried it in 15 minutes and they found that a little tough, but they could do it in 20 minutes. It's a real challenge to them and it gets them to learn pace and it also gets them to be a little bit reckless. Some of them got too reckless and after about the first five minutes they were done, but oddly enough, some of the first to make it did it entirely in 220's. They'd sprint a 220, then walk a little; they knew they didn't have too much time to waste but when they found out how tough it was, they took it as a real challenge. But that would make a good workout for either high school or college. (Werner) I can think of just one more thing here. I think it is well to let them know that what they are doing is what has to be done if we are to compete on even terms with the other countries. We have become soft, loafing, taking the car, and so on, but we are still trying to excel other nations. We have succeeded in almost everything except distance running but we're getting there, whether it's because they're getting soft or we're getting tough.

(Doherty) That points up a comment I happened to notice here by Chic Werner in this article on Ashenfelter in which he says, and I think there's a good deal of thought behind this statement although it's a little startling to me to read it, but I think it's meant just about the way it's stated. In the first few paragraphs he talks constantly and underlines the words, "desire," "competitive spirit," "determination," desire, desire. In the last sentence he says, "I believe this quality to be so essential as to allot coaching time along the lines of 70% in creating desire and only 30% to teaching technique and strategy." This, I think, is quite a statement and is along the trends in coaching in this country in the last few years. May I sum up just a little, perhaps. We have attempted here in this panel to emphasize the essentials of training rather than the specific details of training. In the very beginning we mentioned "more running" as being perhaps the most primary factor of all; the matter of speed work of some kind has been greatly emphasized by everyone who has spoken, repeated speed work of one kind or another. The matter of motivation and desire certainly has been emphasized throughout. It is my own feeling that we perhaps haven't discussed pace work as much as we might have. My opinion is that coaches in general are following the over-all type of program that has been advanced here by this panel. The differences in coaching, perhaps, lie in the different emphases which have been placed upon repeated speed work, upon more running and upon pace work, and although I don't think we brought it out particularly, there is a certain group of coaches who feel that training is very specific, physical training is very specific and not perhaps the very general thing we have implied here during the last hour and that training at a specific pace is essential to the best training. That could be an entire discussion in itself.

There are some scientific experiments to this effect, with dogs, for example, which indicate that training at one pace is not effective for training at a different one. Those who emphasize this sort of coaching tend to run their men, as several of you coaches have implied, at the particular pace, time and time again, at the particular pace which they hope their boy will make some time in the future, next month, or perhaps next year. So that, in summary, it is this matter of different emphases which are placed on these fundamentals of running upon which we shall have to reach some agreement in the coming few years. We certainly appreciate the work that this panel has done. It's ten minutes overtime. We haven't made any arrangements for eating. It's assumed that we'll be able to get back here sharply at seven o'clock. The session this evening is again rather long and we need to get started promptly at seven in order to accomplish what we have in mind. Unless there is some important question now we'll stand adjourned. (Applause.)

Evening session called to order at 7:10.

SPRINT STARTING

Coach Ken Doherty, U. of Pennsylvania

If I were to base my qualifications for giving this talk on my success as a sprint coach, I'd give a few short sentences and sit down. I've never had the good fortune to have a great sprinter until last winter when a freshman sprinter of ours won the National Indoor AAU at 50 yards after having been coached a total of at least two minutes after having worked out a dozen times or less. As far as sprinters are concerned, that's about as far as I can make any claims. On the other hand, I tried to write an article for one of the journals a few months ago and they asked me to comment on pictures of sprinting—they had some pictures of—I'm sorry, I'll think of the name later—so I started out by asking myself the question, "Just what do I know, or what can I discover that others know on the subject of the starting position?" And also about starting movements, by which I mean the very first aspects of the sprint within the first ten yards. I felt that in approaching the problem here tonight, it would be worth while to first summarize what I have been able to discover of the history of the starting position and I'll try to do this very rapidly. It's not important who was the first to use the crouched start, what the coach's name was and who the sprinter was, but as you all know, the crouched start began before the turn of the century and a great deal of experimentation undoubtedly occurred at that time as to just what the position of the feet should be relative to each other and also in relation to the starting line. In the reading I've been doing over the last few years, one of the things that has interested me is, "How many of the new ideas that we've developed from time to time are actually ideas that were tried at the beginning of these events and for some reason or other found wanting and then discarded?" Time after time we talk to some of the old coaches and they say, "What do you mean, something new? Why back in my day"—and so on. I'm sure that over the several decades at the beginning of the crouched start a great deal of experimentation on a trial and error basis, what one psychologist calls "progressive approximations of the correct method" occurred. I have a picture of Maxie Long, a great quarter-miler around 1900, 47 seconds, primarily a quarter miler rather than a sprinter but nevertheless a fine sprinter. You can see from the position that he has there, it's the set position, that there's not much difference from what our champions would use today. The front foot is hugging the starting line, within three or four inches, perhaps, from the starting line, but the back leg is approximately as many of our men would have it at the present time. The lower picture there is a picture of Duffy who in 1902 ran 9.6. The spacing there, as I have put it on this chart, is eight inches back of the starting line for the front foot, and the back foot seventeen inches behind the front one. Incidentally, you'll find this in "the damned book," as my wife calls it, in case you're interested. The starting position here is what Coach Holmes, if he's still with us, used to call "the orthodox start." Now I think that it is the starting position that was used perhaps 90% of the time up to 1925, even possibly 1930. I think that was accepted as the accepted orthodox start, using the spacing as it is given there and with the hips being about as high as they are here and the shoulders being a little forward of the hands at the starting line. The upper picture is of Jesse Owens. Incidentally, I got quite a shock the other day when I realized that Jesse will now be 39 years old; he can't be that old. But here he is in a position—and I questioned Larry Snyder about this—in a position which Jesse used when running out of holes, which he did almost exclusively. He used blocks later in his career. (Snyder) He used blocks except in international competition. (Doherty) He certainly used them in Ann Arbor. His starting position is one in which his feet are very close to the starting line. I've read some of the talks that Larry made in clinics of this kind in that period and Larry made the statement then. He figured that the closer those feet were to the finish line, the more advantage he would gain. Now I think I'm right in saying that Larry, a little bit later on, had a tendency to move those feet back and last night Larry commented that when Jesse was running out of the blocks, he had a tendency to move both feet back. Is that correct? (Snyder) About three inches. (Doherty) About

three inches back of where they are in this picture. Now I put an estimate of eight inches for the front foot and twelve for the back. I think he mentioned nine last night and eleven. Is that right? (Snyder) The front foot was about ten inches back and the other one about seventeen or eighteen inches from the starting line. (D) Running from blocks, you mean? (S) Yes, from blocks. (D) This is correct from holes? (S) Yes. (Doherty) The next is a picture of Golliday, whom, early in 1952, I was picking as the future great champion and therefore I stuck him in the book as being the ideal sprinter to have in there. Unfortunately, of course, he was injured. Now he typifies the present day terminology of the "bunched start," in which the front foot is placed approximately 17 inches from the starting line and the back foot about 11 inches behind the front. In practically all of this work up to, let's say, about 1930, it was trial and error methods throughout. However, the Iowa studies which were published by a group of men, Kissler, Dickinson, George Bresnahan had at least the inspiration though I don't know how much of the work he did—these men made a series of studies which had a definite influence on many coaches. I remember the discussions that followed. There were many coaches who disagreed definitely with their conclusions; they said that Bresnahan and his associates had made certain assumptions, that these assumptions were unjustified. Nevertheless, they came to certain conclusions based upon their studies. In summary, this block position was the one that gave the fastest start out of the blocks. Now by the fastest start they meant that the feet cleared the starting blocks faster than with any other spacing. I think this has been generally accepted up to 1950 when Franklin Henry, U. of California, made his series of research studies which have been reported in the Athletic Journal but more particularly in the Research Quarterly. I think that he has reported three different studies. Henry assumed that the important thing was not how fast you got out of the blocks, but rather how fast you were moving when you got out of the blocks. What your velocity was when you got out of the blocks. I have brought here tonight some of his material; most of what I have to say here is based on what Franklin Henry found in his research. This is not of much importance; it gives you an idea of some of the machinery he used. Actually this is Dr. Cooper down at Southern California but he was using some of Dr. Henry's machinery at the time. It is set up to discover the amount of force that the feet place against the blocks at the various phases of the start. He has other machinery, of course, with which to find out other details. There are many, many important things on this chart; I hope I can bring out the most important ones. These lines here, at the back of the chart, are the foot-pressure that the back foot exerts against the back starting block. These lines are the averages for the 18 sprinters who took eight starts each, eight sprints each, a total of 144 sprints and his research is based on that number of sprints. Perhaps it is not an adequate number. It may not be sufficient to establish the reliability of his conclusions but he assumes that it is and certainly it is an indication although it may be that he should have taken even more examples. In these charts we have all the averages for all the starts taken by the 18 sprinters. You will notice that the amount of foot-pressure against the blocks is much greater in the case of the rear block than it is against the front one. Here approximately 90 pounds pressure, there 140 to 150 pounds. In all his work, he found that the length of time the back foot pushed against the back block was about the same for fast sprinters and for slow sprinters and regardless of the placement of the block. The length of time shows not much variation in range of time difference. The important thing, then, in regard to the back block was the amount of pressure that you could put against the block, not the length of time that it pushed. Let me comment on that. As I mentioned this afternoon, in terms of velocity of the body, the important thing is the amount of power or the amount of force exerted against the block and the time through which that force is applied. Here the time factor is not important but the force factor is very important. And he found, and I hope I'm right on this, that this dotted line is the 11-inch spacing between the blocks, one block relative to the other. This would be the 21-inch spacing and this would be the 16-inch spacing. In another piece of research he comments that for some reason he doesn't think there should be so much variation between the 16 inch and the 21. So much for the background. Now the front block there and when I say front block I mean the front foot there, you will notice that the front foot begins to push against the front block a little later than the back one. He makes the comment that the ideal start would involve a simultaneous pushing of the feet. I think that's Franklin Henry's own opinion and not necessarily fact, but at least he does have that opinion, that theoretically they both ought to push against the blocks simultaneously but in no case has he found such an "ideal" start, the front block push comes just a little later as indicated here. This heavy line is the average of the starts made by the fast sprinters, this of the middle sprinters and this of the slow sprinters, the difference, of course, being shown to a certain extent in the time at which that push starts, in the swiftness with which the force is applied and in the uncertainties, if I may use the term, with which it is applied. You see the poor sprinter, the slow sprinter doesn't get that even push against the blocks that the fast sprinter does. Notice that the fast sprinter reaches the full extent of power approximately at the point when the back block is losing the full extent of power. Let me say that again. Just as the back foot has reached the full extent of its power at this point here, and that seems reasonable. Again, Franklin Henry would perhaps like to see this line moved back into here so that they would occur

simultaneously. The important points for Franklin Henry would be two, in contrast to what Bresnahan and his associates did. That the force factor is obviously important and you've got to get that. But even more important is another factor, the time factor and in here you notice that the length of time in which both feet are working against the blocks is relatively great. In Bresnahan's studies—actually it was a group of men and not Bresnahan only—the men would have cleared the blocks back in here. They would have come out of the blocks faster but since they stay down in the blocks longer in this case, their velocity is actually greater. This chart has to do with the different block spacings and you will note that the length of time in which pressure was applied against the block was least in the case of the 11-inch spacing and progressively greater as you move to 18, 21 and 26, so that the greatest length of time occurred in the 26-inch spacing rather than in any other. Now again, Henry gives a personal opinion which may or may not be based on fact, that the 26-inch spacing—I'd better pause here and tell you that I don't know, Henry doesn't indicate the distance of the front block in back of the starting line. I've written him letters and somehow, he either misses my point or he refuses to answer. I don't know; I heard him twice but I still don't get any answer to that question. But let's assume that the distance is, say, 9 to 12 inches; the distance between the blocks would be 26 inches in this case. This means that the knee would be approximately at the heel or the ankle, the back knee would be at the heel or the ankle of the front foot, a very wide spacing between the blocks. But he feels that that position causes the runner to have poorer co-ordination as he gets into his first five yards and is therefore a less desirable spacing from that standpoint despite the fact that here it would indicate that it was the most desirable spacing. My own thinking is that 26 inches is perhaps the most desirable if we'll spend enough time in which to prevent that stumbling and do the necessary things to get a well co-ordinated start.

Now let me leave Henry for a minute and give you some of my own opinions on the matter. Research of this kind is extremely difficult to do. Every time you do something, you make certain assumptions. You realize that there are many variables every time a man takes a sprinting start. I questioned some of Henry's research on this point and he gave me certain answers. He just assumed that these variables were negated out of the picture, they took care of themselves. I can't use the language, I'm not enough of a mathematician to even talk the language, but they take care of themselves statistically and do not seem to disturb him in making his conclusions. My own feeling, however, is that the reason we don't know what block spacing to take cannot be explained on the basis of individual differences. I've had arguments with some of you men on this point time and time again. But because we have so many uncertain factors over which we have little control, we find it difficult to come to any definite conclusions. I don't think, personally, that men should take different positions in the blocks because one man is built differently than another or that one block spacing is better for one individual than another. Probably none of you in this room will agree with me on that point but I'll be glad to argue it with you at any time. In Franklin Henry's research—you'll find it in the Research Quarterly if you're really interested to study what he did—he came to the conclusion that body build had nothing to do with the block position. Now that's a very strong statement and you will probably all disagree, but go ahead and look it up and you'll see what his approach was. At least it's interesting. I personally think it has much less to do with the placing of the blocks than we ordinarily assume. We can take any block position we wish. That block position and the hip position, the height of the hips, and the forward lean, these produce certain effects in the start, in the first five yards. We can negate certain effects, we can balance them out by doing certain things in our preliminary actions. If our hip position is high and our forward position is straight or well forward, which would normally lead to stumbling, all you need to do is lift up your eyes, look down the track to the finish line so that your head is up, chop your lead arm so that it comes up in a vertical position, bring your knees up high, and by practice a man using this position—which perhaps you would all agree was basically wrong—a man could get a tremendously fast start. Now I think that that is true in almost every example. Take Dillard's position with his eyes looking down at his hands, which in most cases would lead to stumbling. Undoubtedly Dillard, in one way or another, using that extreme aspect of sprinting, in a high focus, was able to overcome it by making other adjustments and therefore did not stumble. This is particularly remarkable when you think that he has that high hurdle only fifteen yards away. So, to go back to my first point, I've written to Henry and have contended all the way through that in conducting research of this kind, somehow you've got to balance these variable factors in getting your conclusions, that you cannot just ignore them and in setting up any position of this kind you'll always have to take care of the matter of hip height, forward lean, how you focus your eyes, the inclination of the body as you come out of the blocks, how long your strides are, etc. Only insofar as you take them into consideration can you come to any real conclusions. I think I'll go back to the pictures now. In trying to get this thing clear in my own mind, I asked the question, where can we place the back block? If we can place that in a certain position we can move from there to the placement of the front block, to the height of the hips, etc. It just makes sense to me that the back position ought to be placed in terms of force. If Henry is right in saying that the primary function of the back leg is a force function rather than a time function, then

that back leg ought to be in the most powerful position possible. Some of you disagree; some of you have already written me comments in regard to it, but following Henry's logic: if force is the factor, then the back leg ought to be in the most forceful position. Well, what is the most forceful position? I certainly didn't know so I started digging in the various books and the only thing I could come up with was that in the leg lift exercise Cureton had found that an angle of 102 degrees at the knee was the most powerful position that they could get. In lifting weights, in lifting springs, 102 degrees or in other words, a little more than a right angle. Not much to go on, but at least it's a beginning. There ought to be some research; is that the most powerful angle when in a starting position? You can't assume that because it works in leg lifting, it will work in starting blocks and I have already written Henry suggesting that he go ahead and find out the answer to that question. But assuming for a moment that it is 102 degrees, then a man ought to place his back block so that the angle at the knee is 102 degrees. If you lift the hips that increases the number of degrees so you have to decide ahead of time on the basis of your judgment how high those hips ought to be and how far the forward movement. Then place the knee at 102 degrees. Also the angle of the front knee should be 102 degrees as it exerts maximum force. By the time the back foot leaves the block the front knee angle should be 102 degrees. I found that the resulting position would be that of the old orthodox starting position.—

Although in Franklin Henry's research he says nothing about the distance from the starting line to the front foot, he does indicate that the 16-inch and the 21-inch spacing are best, which when interpreted again means the old orthodox start. Now this is a kind of circuitous way of reaching a conclusion but to me it made sense, on the basis of trial and error prior to 1930, on the basis of Franklin Henry's research which I think has greater validity than the Iowa studies of 1934, and on the basis of this (more or less) reasoning, that this conclusion was a justified one. This happens to be a picture of Lindy Remigino who, I would interpret, has a bunched start position, that is 17-11 position which is the one Bresnahan and his associates would have advocated. Let me take some time here to make some comments. Notice that in general the drive or the force of his impulse is in a straight line toward the finish line, that he does not come up, but rather goes out in a straight line. Picture No. 4, I think, is a rather excellent one. It is possible that he has cut the left arm somewhat in its action, that it ought to be out somewhat straighter and it's quite likely to straighten him up too soon because of that chopped left arm. I'll show you some other arms here very shortly but in general, I think his action is excellent in terms of driving straight out. Here's one of quote my boy Jesse unquote which is very similar to the one I showed you in the drawing earlier. Unless there are some questions I'll just let it go. I'm more interested in this next picture indicating an excellent forward drive coming out low from the starting blocks with that front hand going out straight toward the finish line rather than chopping up short around the left ear as I indicated in the case of Remigino, the back arm being high enough to keep the man forward. There might be some indication of strain in his overall position and perhaps in his hands, Larry, perhaps you'd like to comment on this open hand position. Does it have any significance at all? (Snyder) No, we didn't like it at all and Jesse later got away from it but it was something that he had done and it took him some time to get away from it. (Doherty) It was something that Jesse originally had and later got away from and not a matter of coaching. It does indicate a certain tension. Here's Frank Wykoff; notice his arms, how the left arm drives low and straight out and the upper arm high, again despite his focus of eyes. His eyes tend to raise his head and therefore bring him up rather than out and to counteract that, this illustrates the point I made earlier, that his arm action tends to keep him down. In my opinion he would have been better if his eye focus had been closer to the starting line and his head down a little more and he would have been able to use that in connection with his arm action and come out a little straighter. (Snyder) Do you like his lead arm? (Doherty) No, I do not; it's very straight and I should think rather awkward. It just happens that I have a series of pictures here illustrating arm action and it's really not in keeping with my general comment. The man next to him there has a good arm action although again perhaps the left arm is a little too high, too close to the ear; that's the great George Simpson, one of the very greatest and if he hadn't had those bad legs for years he might have been the fastest ever. Excellent knee action, obviously, but again I'm more interested in the arm action and the head position. Notice here's an illustration of a man with his head in line with the angle of his body as a whole and his eyes definitely down but the arm action of the left arm, perhaps, tending to straighten him up. Any comment? Again an excellent position of Stanfield, this came out of a London paper, considered in terms of arm action, it illustrates what I would consider excellent arm action and the overall feeling of a forward impulse rather than an upward impulse. Here's another series based on Stanfield, frankly, I used this in my book. I took the liberty of changing what I thought wasn't proper and I put him in a position which I thought was a good starting position but I'm a little dissatisfied with the thing now but when I drew it it looked all right to me. My present feeling is that in A2 the back leg has been drawn too far back and that he has in this picture probably a 26-inch spacing rather than a 21-inch spacing which would probably be more desirable as I now look at it. To me he gives the impression of being a little too much spread out. His action as shown in the succeeding pictures again is excellent as

shown in the earlier picture in terms of the forward drive. Just the comment that there are these two starting positions, when you're on your marks, that is, in which the front figure is well forward on the hands and when he gets back on his feet and his knees and when he gets set he rotates slightly forward. The relative advantages and disadvantages are, I think, obvious, too much so to merit showing at this time. In case some of you have not seen a starting gate, I thought this might be worth showing here, Ben Ogden's invention which will be used again this year in the Philadelphia Inquirer meet, but I think this is the only meet in which it's being used, not through the fault of the starting gate itself, I think the gate itself was very successful—but rather because of the inability of men to practice with it. It is expensive; it's very difficult to carry from one place to another. Ben Ogden had to do it entirely on his own; he lost thousands of dollars on this thing and he's just about ready to give up on the whole procedure. Now in my opinion, the starting gate had very worth-while features but it does take some practice, some drill, and there are advantages and disadvantages but until there would be a chance to practice with it I don't think it has much chance of being widely accepted. Could we have the lights, please?

I think I can say as a matter of reasoning and logic, the value of the arms in driving the body forward at any time during the sprint should be stated entirely in terms of relaxation and balance. Perhaps the exception to that is in the first few strides in which the position of the arms, the use of the arms aids the forward inclination of the body but there again, I suppose, it's a matter of balance. But in my opinion the weight of the arms themselves relative to the overall weight of the body plus the fact that there is always a forward and backward action means that it's impossible, anatomically or any other way, for the arms themselves to move the body any faster forward. I've sent out a copy of this article I wrote to Franklin Henry and to John Barnet at Springfield, etc., and they agree entirely on this point. Neither of them professes to know anything about track but this is a matter of physics, etc. They believe that the reasoning is sound. You may keep to your own opinion. I have two other items. This matter of focus of attention. Just last spring Mel Patton published an article, *Athletic Journal*, I think it was, in which he stated that he himself—and he advocated it for others—focussed his attention on the gun and that he thereby got a better start. There are no studies in any area, psychology, industry, etc., that would substantiate such a statement. All reaction times are faster when attention is focussed in terms of action rather than in terms of sound or sight. To me there isn't any question about that; it's simply a statement of fact. The questions lie first in what Mel Patton meant when he said "focus upon the gun." Frankly, I doubt that he did it. I doubt that his mind was actually on the gun in the hand of the starter, that he was thinking about that black object of which he was going to pull the trigger, that his mind was actually on the running and on the going, but as a way of speaking his mind was on the gun. I think that it would be impossible for him to get a fast start and really concentrate on the gun. Another question is, what does it mean to focus upon action? upon going? I think a man can concentrate on the important aspects of moving and get a faster start. Reading Canham's good book, he comments that attention should be focussed upon the speed with which the back foot is brought forward. That may be true and it may not be true but I'm sure that this focus of attention is a very specific thing, not a general thing. I don't think you focus upon movement in general but rather upon specific action and that should be in terms of leg action because that's where the force lies and not in the arm action or some other aspect. I made the statement this afternoon and I repeat it for the record, that all three studies agree conclusively that there is no correlation between reaction time and speed in sprinting—this doesn't make sense to me either—that the fast sprinters do not have the fast reaction and contrarily, and so on. I don't know what that means for us; maybe it's just a matter of interest rather than anything we can use but nevertheless that seems to be the case.

I don't even think it's necessary to take the time to summarize what I've been trying to say here. I won't summarize but I'd like to make this comment. I believe that there are ways and that we have not utilized them, of finding out the certain facts in regard to track and field events such as sprinting (and starting) and I think that we as coaches in our individual schools but perhaps more than that should be stimulating other schools and such people as perhaps the Helms Foundation and Athletic Institute to encourage research men such as Franklin Henry and John Cooper and Cureton and others. There are many such men throughout the country who should be encouraged to find out the facts in this thing insofar as they can. I'm not going to be pleased with them and you're not going to be pleased with them, you're always going to interpret them in your own way, I feel sure of that. But nevertheless they can come a little closer to the truth, not on a trial and error basis, but a little more on a factual basis than what we have had in the past. I think we've tried trial and error for the past 75 years and we're now reaching a stage where we have to look into our subject further and go into the more scientific aspects. I'm sorry I've taken so long. (Applause.)

We haven't time for questions; I'm sorry I've taken more time than I was supposed to. We have the hurdle panel to follow immediately. Again we're extremely fortunate in having Dan Kinsey with us, the 1924 Olympic champion in the high hurdles, a man who has been intensely interested in track through the years and who has been interested from a practical as well as a theoretical standpoint as well as

any of the coaches in the country. I have listened to Dan on several occasions and he always contributes a great deal to whatever is talked about. But we wish to thank him particularly for his work here in bringing this spectral analyzer—is that correct, Dan?—this projector. I wish you'd comment on that while you're up here, Dan, because I think all the coaches will be interested. We have been using it all through the meeting, as well as the loop films on which I think Dan has done more than almost anyone else. The work that Dan has done in the way of preparation has been perhaps the most important part of the whole clinic. Then we have Ivan Greene with us, from Cleveland East Tech. High School. The school's chief claim to fame is perhaps not as the developer of Dillard, but as the developer of the high school sprinter who beat Dillard. I understand that Dillard had run a few 220's first, but he was telling me the other day how this boy who is now in school managed to get to the finish tape a little ahead of Harrison. We'll hope that he's another one in whom we can all take pride in the future. And we also have Lloyd Duff who is now assistant track coach at the University of Pittsburgh with Carl Olson. I never thought of this statement until it just came to my tongue, but Lloyd is perhaps as great a hurdler in terms of his height as we have ever had. His performance of 13.9 for the highs I thought was very remarkable and incidentally, he was a wonderful decathlon prospect in Yost Field House one hard afternoon. He could do many things and do them well. Pittsburgh has been having hurdlers during the past four years and I don't think that it's a coincidental matter at all. Monahan, one of our best college hurdlers in the last couple of years, I haven't talked to Carl about it, but I just have a hunch as to where at least some of the coaching came from. These three men constitute our panel. Now, gentlemen, if you'll go right ahead.

PANEL ON HIGH HURDLES

Ivan Greene, Cleveland East Tech. H.S., Lloyd Duff, U. of Pittsburgh,
Dan Kinsey, Oberlin College

(Greene) Around East Tech. they give a definition of an assistant principal; an assistant principal is a mouse trying to grow up and be a rat. On that basis I feel like a mouse among my superiors here tonight. About that hurdler of mine, I only wish to gosh I had a hurdler who could best Dillard even after Dillard had run 220. It may interest some of you to know that Dillard is going to run this year, that he looks better than he did last year. Now we have this hurdle program set up. We thought that first we'd have some remarks from Lloyd Duff, first on the things to look for in the pictures we're going to show and then have Dan Kinsey talk on this projector and the uses that can be made of it in picking out these various points. Now, Lloyd, if you'll come up and work on the points to be looked for.

(Duff) I feel as if I had been put on the spot here, standing up before a group which includes two of my former coaches and trying to tell the group how to hurdle. Certainly they are the ones who should be up here instead of myself. However, I'll be glad to do what I can. We talked hurdling this morning when we checked through our movies and came to some conclusions, or rather some points we wanted to bring out and also points that we thought were important to look for while we're going through these movies. One point seemed to be evident to us and I think it is to everyone and that is, that hurdling form is going to vary according to the speed and the height of the hurdler. A boy who has a lot of speed and is short is going to—just from a physics standpoint—cover more distance over the hurdle than a tall boy because he has to work his crotch so high to clear the hurdle that with his great speed he just can't get down to the ground sooner. The tall boy who doesn't have to raise his crotch can get his leg back down on the ground. So it sets up a different problem for different hurdlers but each one, of course, is trying to accomplish the same thing. All of them are working on the same thing so we'll start from the beginning and bring out some of the points we ought to check on. One thing, I think, is important, speaking from the standpoint of the short hurdler and that is that the short hurdler must get up to his full height, I would say, by the fifth stride. (This probably won't be shown in the movies because we don't have the start.) If he is still rising from his start, he tends to sail over the hurdle and it takes him two or three to where he can get back down and make a low clearance. So it's important for a short hurdler to get up to full running height, on his toes, and feel that he can come down to the hurdle. Now the taller hurdler doesn't have quite the problem but I'm sure that also he should be up in full running stride before he gets to that first hurdle. Things we want to check: on the take-off most of the good hurdlers are up on their toes as they take off, which incidentally will raise the crotch three inches and is certainly worth while doing. Some beginners, I think, hit on the heel and try to take off more or less flat-footed but they tend to ride on through the hurdle and skim it or sit on it. I think that if they are up on their toes and, as we'll mention in a moment, dive into the hurdle, then they won't do that. The lead leg is most important. Most of the examples we have here show the hurdler leading with the knee which we feel is very important. Watch the knee coming up with probably relaxed lower leg and we want to watch what happens to the knee when it comes up. There has always been a question,

Larry worked with me for three years in trying to keep a bent knee on top of the hurdle with the idea of being able to get it down quickly on the other side. It's a most important thing to work on. I don't believe, from the movies I've seen, that I was ever able to do it. Dillard doesn't do it but the taller boys, I think, are more able to do it. I think that Attlesey was able to keep a bent knee on top and Finley was also able to do it. So perhaps a short boy can't do it but if he's thinking about it he will be able to strive for that bent knee and snap it down quickly on the other side. So watch that leg come up. We also want to watch the opposite arm which is counter-acting for the upward motion of the knee. Where does it go? Does it come out high in front of the face or is it down low? Does it reach out and down or does it come across and swing back? As it clears the trailing leg, is it out to the side or does it swing around back pulling the shoulder off balance or does the elbow lead back which would tend to keep the shoulder more straightforward? Again, a lot of it is compensation. I think we'll find in examining Dillard's pictures that although you perhaps won't agree that it's the correct form or the perfect form, it is a form Dillard had to use. He was up in the air or covered more space over the hurdle than any one else we have measurements of and while he was up there he had to do certain things to keep on balance so perhaps we can bring some of those out as we go through. Another point is the trailing leg pulling through; does it pull through level or is it on a slight angle and what happens to it as it clears the hurdle? Does it come through parallel with the knee and then drop to the ground or perhaps as Dillard's does, does it pull up in front of the chest and push down? From Larry's coaching, I've always thought of the trailing foot as pulling straight through behind the knee. As we mentioned this morning, however, some hurdlers are keeping the foot up closer to the buttocks as it comes through so we might watch for those in the pictures we have here. The landing also is a very important and essential point and I think you'll find that a lot of the hesitation and the breaks in rhythm which you find in hurdling come from that landing. We'll watch whether or not the front foot lands in front of the body, underneath it or perhaps a little behind it. Here again the tall man has the advantage because with his bent knee he can drive it down under and his weight will land directly on top so if we watch the position of the foot in landing we'll see what happens there. The back leg pulling through; does it reach out a lot or can it keep in an even stride as it goes through? I think we'll notice a dive in all of the hurdlers; it's a word I've heard again and again and I think it's the best word I ever heard in hurdling. To dive at the hurdle gives you a feeling of getting down, of getting the shoulders forward, keeping the chest down close to the hurdle and the head won't rise. I think you'll see with Attlesey that there's a decided duck with the head, his head even goes lower over the hurdle so there might be a point to pick up there. Most of these points we'll certainly discuss as we go through the pictures so I won't spend any more time on them now. Dan, do you want to take over here?

(Kinsey) I'm not going to say much here; I'll spend most of my time by the projector because that's where we'll learn most. There isn't very much to coaching hurdling. All you have to do is get a good hurdler and don't spoil him. Some of us get good hurdlers, but others have to make them, refine them and change them. Seriously though, I think that it's very important to realize what is involved in coaching any event. That's why it's very important to have a clear-cut concept, a clear-cut view of what the performance should look like. Many of us are very hazy on that. We have a general concept but it's not very clear-cut or very specific. Some of us have it but we have it in the back of our minds rather than in the front of our minds. That's why I say it ought to be in the front of our minds and ever-ready to give out and to use when it's necessary. Where does that come from? Well, it comes from much of the reading that you have done and the number of years of experience you have had. Some of you are just starting out, some of you are a long way in the process, but you never get to the point where you think that this picture of how hurdling should be done is final in your own impression. That's when you begin to die and you might as well sell insurance from then on rather than to keep on coaching. Keep it alive and keep it clear-cut. After you have that clear-cut concept, then it becomes very essential to be able to see that picture. I think that most of my coaching failures have been on this particular score. I haven't been able to see. You look at your hurdlers or look at any of your performers over and over again but unless you actually see what he is doing—clearness of seeing comes from having the picture in your mind first. Maybe some of you remember that way back in the early days, in 1938, I wrote an article in the Athletic Journal on "Observing Hurdle Clearance." That's what I had in mind then, standing in certain positions and what do you actually see, actually look for in these certain positions? I think it's very important to be able to see and that's why I think that this projector is extremely important because it helps people to see, and see in the tempo in which a lot of us need to see. If things go fast they go through us, beyond us, rather than making any impression. Slowing up the picture as this does, at two frames per second, and you can stop the picture at full luminosity so that you can see it just as clearly as you can a moving picture which is impossible on any American projector. I think you are able to see more things from that standpoint so it's very good for coaching. It's also very good for teacher training and that's a very important point. I use it in connection with my coaching course in taking people who are going to be coaches and teaching them to see. Now that sounds like rather an

odd thing to do but actually you don't have much time. If I had time, if I could show you a picture of a performance—take this one, it's one of my favorites—a girl doing a two-and-one-half front somersault in diving. Go over it and see the mistakes she makes, go over it and stop it and show it very slowly—see the spot where she opens up? Do the same in pole vaulting, slow, then at normal speed. Only then do the students see what has happened. This helps make better teachers and coaches.. The next aspect is knowing how to correct. You learn that from your reading and from thinking your own individual problems through, and by that I mean having a good man and studying him. I think maybe we don't always realize that our better men make us good coaches in the sense that we study that individual and find out what other people have done in terms of correction and then realize that you can know an awful lot and care an awful lot and see an awful lot and have a lot of good ideas on how to change things and then you find out that people don't change anyway. It's very, very discouraging sometimes. I sometimes think that we don't do a great deal of changing in people's form; we work on them and then we think, perhaps this is better for him anyway, individual difference, and then you let him go on doing it in his own way. Then if he happens to be successful, we think, "This is a new technique." That happens over and over again. With this particular projector—let me say one word first. This projector was developed in England at the request of the British Air Ministry. As you know, during the war all the aeroplanes had moving picture cameras. They took pictures of every shot taken from a plane and they found during the last war that slow-motion pictures, even the slowest they had, didn't allow them to see the things they wanted to see to make their air missions more effective, so they asked this company to develop a machine that would slow things up and also give a clearer view to the still picture. They set about this and with the help of a Czechoslovakian engineer, a refugee incidentally, they developed a machine that could be used for that purpose. It was set up so as to be foolproof; it's the easiest machine I have ever seen to thread and get ready. I thread it wrong two or three times within a minute. It was used during the war and after the war, it was taken off the aeroplane; I only hope it will be used in this country as much as it has been in England for track and other purposes. The loop films, of course, are old; some people have been using them in this country. I think I've been using them for about 15 years. I've been taking these pictures and hanging them up and letting each boy come and use them by himself. Our hammer thrower here from Rhode Island has been taking these pictures too. Tootell says that the boys come in and pick up their own pictures, run them through on the projector and see their own mistakes and see what they are doing. That seems like an excellent idea because you certainly can increase the boy's interest in his performance when he can see what is the matter with him. When I came back last fall from England, I had a boy who was ready to quit in the pole vault because he never could see himself getting any better, and then I had pictures taken of him showing him what he was doing and he immediately became 100% enthusiastic about pole-vaulting again and he went over the hump on that particular time. So it's very important to use in that way. But let's go back to the pictures. (Q) How much does this projector cost? (Kinsey) The camera costs \$280 delivered to you, I mean the projector. I'm not interested in this thing as a commercial enterprise; I saw its use in England when I stayed there on sabbatical leave a year ago and I brought it back because I thought it could be used so I got it at that price. That's just the cost plus handling. Not that I'm planning on losing anything or making money.

(Greene) Now let's speak about the setup of the loop films as we have them arranged. As we went through the films, we had decided on a certain order. We thought we'd start out with the high school boy starting out in his tenth grade year and of course it's going to look like the dickens; it's just one of the many boys that we've run through the mill at East Tech. He's been through long enough so we know how he made out but I'd like to have your idea as to whether you would keep him or throw him out. Then we'll show you some movies of some freshmen at Pitt., then some of Lloyd Duff and then some of a meet in which you can see five boys working hard against each other of whom at least two are very good. Then we have a picture of Attlesey which we think shows just about the ultimate in good form. Now in running this I have the job of announcer and I'm going to make good use of it. I've discovered that the only way to keep a reputation for knowing anything is not to say anything. So I'm announcing what we're going to do and when you have these tough questions to answer, Lloyd Duff and Dan Kinsey are going to answer them.

(The pictures were then shown.) This is Albritton—This is Dillard. There may be hundreds of boys who look like that in high school and you'd never suspect you've got a hurdler. (Duff) I think you've all seen this series of pictures which appeared in the Scholastic Coach. Dan, if you want to join with me on some of the comments. You notice the difference between this and his high school form. His arm here, his left arm extending straight up—his leg has become straightened out even before his foot gets to the hurdle, perhaps sitting up a little bit too straight, you might call it lack of dive. I'm always sorry this series didn't run at least one picture farther; Dillard hasn't quite hit the ground here. I mentioned the landing position; possibly, when he lands, when his foot comes in contact with the ground in the last picture his weight will be over in front of that foot. At the present time it's hard to tell just what

would take place. You'll notice that the left arm is thrown backward, a straight arm, quite high and then thrust forward. It's my own belief that is the combination he had of tremendous speed and the low crotch which took him longer to get down on the other side and he had to do something with that leg. It was something he developed and there certainly never was a boy more agile or supple than Dillard. (Someone suggested that the picture was reversed.) A picture from the Penn Relays. Notice he uses a double-arm action over some hurdles and at other times the right arm doesn't seem to come up quite so far. That's Mitchell of Georgetown in the second lane from the right. Gehrdes. I talked to Chic about some of the work he had done. I think that a good bit of that double-arm action was a corrective thing, that Jim again was a short-legged hurdler and had a lot of compensations to make. The double-arm action was one of the compensations. Notice that Mitchell holds a pretty good position over the hurdles and comes off fairly well. The boy in the right lane, the Cornell boy, is bringing his left arm way across in front of his face and you'll notice he straightens up and pulls his shoulder back as he comes off the hurdle. His arm sweeping wide to the right pulls him off balance.

Perhaps I could tell you of some of the things I'm thinking about at the time they're being done. Being very conscious of the dive and the bend of the trunk I've noticed in the first picture, this dive continues then as the leg leads up, the left knee is coming up. The right hand is reaching out to counteract the upward lift with the thought in mind of bringing it down, of sweeping down past the foot and coming back on the outside with the elbow leading. Just to follow the arm action through, the idea is to reach out straight in front of the shoulder, not necessarily across or even to touch the toe, but simply in front of the shoulder and then bring the arm down, sweeping it down and coming back with the elbow rather than sweeping it outside as we noticed in those Penn Relay pictures. As I mentioned, I tried to keep a bent leg on top of the hurdle but as these pictures definitely show, it's not there. The trailing leg however, is coming through level with simply a continuous motion, not being jerked through but just pulled through smoothly. The landing position, again, is the same as Dillard's, and again we need another frame on there to find out just what the position is in the landing. With the right leg as the knee is coming through reaching out as it goes down on the ground. (Kinsey) The matter of the knee is something we talked about quite a bit before in connection with how high it should be. If we adopt the policy, for instance, that hurdling should be as near to sprinting form as possible, then there isn't any reason at all why the knee should go any higher than the height of the hurdle, actually only to clear the hurdle though in the form that Dillard presents it does go considerably higher than that. I'd like to have Lloyd say a few words about that, that in the case of Dillard it is an essential, as he feels it, to get his knee up high like that.

(Duff) I thought I had mentioned that in the trailing knee. What does it do for him? He's covering 13 feet coming over the hurdle, taking off 8 in front and landing about 5 behind where we previously thought about a lesser clearance of about 11 feet, 7 and 4, but I think perhaps that is impossible for a shorter man to do. Dillard, being able to run a 9.5 hundred, has that tremendous speed with a low crotch; his trajectory is going to be rising, it has to be, going into the hurdle. His take-off is going to carry him farther, assuming that he just clears the hurdle. Now while he's coming down he has to do something with that leg, with the trailing leg. If he brought it through level and carried it to the front and then down, I think you'd find that he had a chopped step in there. His two feet would land too close together, his right foot coming down and then the left foot being brought through quickly and not up to the chest, it would hit the ground and you'd have a short stride in there which would cause him to gallop or perhaps to stagger off balance. So I think in compensation for that—his time in the air, incidentally, is a fraction longer than mine and a good deal longer than Finley's. There is a compensation for that. In regard to this compensation, I can remember down at Dayton—Dillard's winning streak was still going at about 75 victories—he was running against Dick Maxwell, my teammate, and Ed Dugger in the AAU meet. Well, he hit the first hurdle, banged into the second one, hit the third one and almost went over on his face. By that time Dugger and Maxwell had pulled ahead at least five yards. Dillard was able to recover and clear the next hurdle and get back into stride again. He won the race, I think it was either 14.1 or 14 flat. But he was able to recover his balance and I think that his ability to do that as exemplified there permitted him to get away with some things most other boys can't do. So the combination of his suppleness and agility plus his speed would account for the variations from what we might think of as the perfect form.

(Q) Does that matter of suppleness depend at all on that bent knee? You're not going to think about bending the knee or keeping it bent on top of the hurdle. Your legs will extend as far as they can and then you let go. The reason you can't stop is because you are that loose; your leg will extend that far. (Duff) My thinking is, if you let that knee—the knee is leading—if you let the foot snap out in front, that is, let it relax and then snap it out, it's going to continue to rise over the hurdle and if the foot is going to continue to go up as you go over the hurdle, then it's not going to come down quickly on the other side. This, I feel, is what you're striving for, to get back to the ground quickly. But I think you're right too. Once you get the knee up here—you're leading out this way (illustrating)—then it's stuck out

at the hurdle; it will snap out straight and then it won't continue to rise. That's what I think happens; we're pushing it at the top of the hurdle but we don't want to allow it to continue on up with the snap. Incidentally, in high school we found in our clinics that coaches allow the boys to lead with a bent knee. A lot of them either misinterpret or let their boys misinterpret by allowing the boys to hurdle with a bent knee but with a rigid leg, that is, rigid with a bent knee so that they come up with a bent leg. It's the same with high-jumping; you can swing your leg up straight and you can get the same lift as if the knee is bent and yet locked. The difference is that the foot is swinging out in front whereas if the knee is not locked the foot stays back. And any time you swing your leg out this way, the reaction is to go back, something which you wish to avoid in the hurdles, therefore you try to lead with your knee and with a relaxed lower leg so that you don't get that backward—(Snyder) like a normal stride, just put your knee up as you would for a normal stride. Exactly.

(Q) Will you be commenting later on the length of strides between the hurdles or will the question be in order now? (Duff) Do you mean the actual measurements between them? Yes. (A) I don't know if I can actually quote them. I think that if you measure from your landing foot to the next stride you'll find it a little bit shorter and then the next stride picks up and the next one will be equal. I don't remember any particular measurements for them; I would say get them as closely equalized as possible. If you find the second stride is shorter, getting a 7 foot stride, then a 5, then two sevens, then you'll find the boy is galloping or is falling off balance in between. To correct that, particularly in the lows, pull that trailing knee through and reach out with it, not necessarily up to the chest but be conscious of pulling through and reaching with it, rather than bringing it down quickly and that will lengthen that second stride. So if it's short, and that's probably the only time you'll worry about it, just bring the knee on and reach out with it.

(Q) I find a problem developing from that in relation to high school performance and I wonder if you know what you did in high school and in college and what Dillard did? (Snyder) If you keep that knee relaxed, I would say, the driving action is going to carry you where you want to be. As long as you keep that lower leg relaxed.—I'd guess that the second stride is about a foot longer than the first and the next one is about a foot or a foot and a half longer than the second one. I don't believe anybody ever measured that because it takes care of itself. (Duff) I think you see it there immediately as the boy's knee comes over the hurdle; you spot it there and then you might measure to show him what caused it.

(Q) I've been thinking about this matter of the distance covered over the hurdle. All the pictures I've seen of hurdlers when they take movies of them always consist of the first or the first and second and maybe the third hurdle, like Dillard's. His stride is, say, possibly 13 feet. Has anybody measured it at the end of seven or eight or nine hurdles? Was it still 13 feet there? At that first hurdle I can alter, or at least this is my observation in working with high school boys, it's always longer over the first and maybe the second but it begins to even out after that. (Duff) I think we measured Monahan's stride and I think we measured my own and found that it was pretty close, not necessarily over the first hurdle, but after that it remained comparatively constant. It was approximately 12 feet in my case. I remember Ganslen took these shots at the second hurdle and took his measurements from that. Finnegan quoted Dillard's as being 13 feet. Assuming that we were right in saying that the faster you get back to the ground, the faster you're going to be able to run, that you can't make any speed in the air, then you have a problem of clearing more distance over the first two or three hurdles, then those are the ones you have to work on trying to cut that down. The only difference between the first hurdle and the tenth hurdle is that come up from the start and normally aren't in a high position where you feel that you can dive into the hurdle rather than come up from underneath and flying over it. If that first clearance is longer, I think that's what we should be working on, trying to get that first hurdle down, working on one, two or three hurdles to get that down. (From the floor.) I don't think we should work on that stride so much as we should on speed. You lose speed every time you go over a hurdle; you lose speed in the air. The problem between hurdles is to pick up the speed that you've lost.

(Marshall) I'd go along on that except when you have men like Osgood and Ladd and Wright, where they can step over those hurdles. Ken, you'll recall the time that Osgood ran the 14 flat that day in the rain. I'll bet that if we had a tape on his stride from when he came out of the blocks to the finish, there wouldn't be inches difference in any of his steps. It looked to me as though every step he took was even. That's why we tried to pattern Ladd after Osgood after that race. But there we had men with height that could do it. (Kinsey) Did you attempt to have Ladd change his stride length? (Marshall) Never. We tried to get him to have every step equal between hurdles. (Kinsey) I feel that if the boy has speed, his steps will be equal but you don't tell him to keep his stride like that. Get there, and by getting there his running will become even. (Marshall) In Ladd's case we coached him to take even strides. Now you take Karl's (Schlademan) boy, Smith, who was very short; with him it's a little different proposition. He couldn't do that because he had to go over farther on the hurdle so the distance from the take-off to the landing was greater. In other words, you've got to sprint those hurdles, one way or another. (Snyder) George, the first stride over any hurdle is going to be shorter than the second or third. That's

because of the snap down. The other two, the nearer equal, the better. Shall we go on?

(Duff) This is one taken in the Ohio Stadium in 1949 in connection with a movie I was trying to make. I think you'll notice that if nothing else, I was up to full running height at least two full steps before going into the hurdle. I think another thing to mention is that when the take-off foot hits the ground in front of the hurdle, you can't wait until you're on that foot or riding on it to start; you've got to feel that you're diving as that foot hits the ground. In regard to snapping the leg down, sometimes you can snap the leg down too quickly and sometimes, you will notice this in taking five steps, it will even come underneath the body. I don't think this ever actually happens during a race. If you snap down too quickly you find yourself falling forward. This is a shot of Walter Monahan who won the Penn Relays last year and the IC4A as a freshman. You will notice a lot of glaring faults here. The boy had never hurdled in high school but he was a natural at the hurdles and it wasn't hard at all to get him to come around. His lead leg, you notice, is swinging up way inside, it's way off the line and his right arm is swinging out way wide. He's just like a bird coming down from the hurdle. His left arm going back has turned his shoulders at quite an angle. He's reaching way up and not sweeping down; that's one thing that he's definitely doing now, he's reaching out and down past that lead foot which helps to give him more dive. He doesn't have nearly enough dive here. You'll notice his head is rising, his whole body is rising as he goes over. I'm sorry, that isn't much of an educational experience and it's also an insult to Monahan to bring a picture of him as a freshman and not have one of him now to compare with it but we don't have one to show.

(From the floor.) I think it should be pointed out that when a man is performing for a camera he runs entirely different than he runs in a meet. I believe we should study more what they do in meets rather than what they do for the camera. I noticed that especially in the high jump today, entirely different form than that used in competition. (Duff) I certainly agree with you. Perhaps I might add this; the things you do in practice, just like in the army when you have to take a carbine apart. You have to do it over and over again, they tell you they want you to be able to do it in the dark or blindfolded. That's the same thing you're working for in a race such as the hurdles where you have to do the things unconsciously. The same thing is true in the pole vault. You certainly don't have time to think of more than one thing at a time so these things have to come unconsciously. I know that in my best race I don't remember anything except the third hurdle. I remember that-(?)-was beside me then and I don't remember any of the other hurdles all the way down. But I must have been doing things right and that only comes through the constant practice and the repetition of the action so that when the time comes you don't have to think about it. If you do practice hard enough then the meet pictures should show you what you did in practice, or at least you hope they would.

(As the reel changed, there was a question about two-arm hurdling.) (Duff) I refuse to be drawn into an argument about one or two-armed hurdling. I don't know enough about it. But I do know that some coaches teach two-arm hurdling as a corrective for certain faults. (Snyder) We used to use it and Earl Thomson, from whom I learned it, used it in practice all the time. Lean way out there with both arms. (Kinsey) The question is whether it is advisable to teach something, particularly at the high school level, which is not the form which you'd use in the event itself. As an exercise it might be a good thing to do but to work on it regularly would seem to cause habits which it would be very difficult to break. Would you say so, Larry? (Snyder) I'm just answering from my own experience on that. Phin Guthrie and I used to use the two-arm forward action in practice all the time, run through three, four, five, six times, anywhere from three to ten hurdles. Neither one of us used the two-arm action in meets but we noticed absolutely no difference in the timing. As to getting the body lower, whether it accomplished anything or not, I don't know but we felt that it did. (Kinsey) Going back to the old times when Larry used to hurdle, I used to do something—yes, I came from that era too, in which if you couldn't run fast you hurdled. The reason I started out hurdling was that I wasn't fast enough to make the sprinting team. But I used to worry about Larry and Phin and those hurdlers who were really faster than I was. I was slow on the ground so I devised a method, and my particular method of trying to stay up with them was to come down sooner. I figured that if I couldn't run as fast, if I could run sooner, I would have some advantage. I don't know if you realize it, but I hold the Drake Relay record for the 122 yard high hurdles. That was in the days that they set you back a yard for a false start. But this matter of coming down sooner really stood me in good stead. If I remember correctly, there was one race in Paris that I might not have won if I didn't get down to the ground sooner. Atkinson was actually faster than I was and the pictures show that he was practically even or maybe a little ahead of me on the last hurdle, that my foot was considerably closer to the ground than his foot. I took my first step just a trifle before he did and I got a little lead because of that. He quickly picked up that lead and when we got to the finish I leaned in and he didn't and that was that. But in practicing getting down fast, I used to run at three-fourths speed, the full ten hurdles, knocking each one down with the center of the back of my thigh. People used to watch me and think I was crazy. I wouldn't advocate teaching people to hit hurdles. I think it was Towns' coach who used to teach him to hit hurdles and fall in order to develop courage.

With this technique, running at about three-fourths speed, I could knock down each of the ten hurdles and have a red spot on the back of my thigh about an inch and a half long, which meant that I hit each hurdle exactly at the same spot. Then running at full speed and pulling up the leg at the same time—of course you don't practice doing something that you don't do—. (Snyder) Did you look at the ground, did you look down at the top of the hurdle? (Kinsey) Yes, either there or over to see where you were.

(Rider) Dan, I want to ask you how you came to use that lead arm clear down here and drop that left shoulder. (Kinsey) We didn't think much about the position of the lead arm but you'll notice here in Attlesey's case, that he has his lead arm up here even with his head and then when he starts to descend on the other side he brings his hand down. I always felt that your arm throw should be below the shoulder level from the beginning, not throw it up and throw it down and get a lean. In other words, your arm thrust cannot help you get a good body lean unless the thrust is below the shoulder level. I used to work on that.

(Pictures of Attlesey.) (Kinsey) You see his leg is not straight, it's almost straight, his arms level with his shoulders but he brings them down quickly. Notice how far forward he is. He comes through very rapidly and his landing position is right over his foot. His stride between the hurdles is smooth but almost bouncing. I think you'll see in fast motion how low his body is. It's actually lower over the hurdle than it is while running. Of course he's 6 ft. 5 in. tall which makes it easier to get over. Notice coming off the hurdle his whole body is low. (Snyder) How many of you men get the impression that Attlesey has to chop his stride? The third stride to the last hurdle? The first step off the last hurdle seems to be short, that is, for him. Remember he could run 9.6 or 9.7. (Kinsey) We don't have the record on the length of his stride but he came down about 4 feet from the hurdle. If those starting lines are a yard apart, he's taking off about 7 feet in front of the hurdle and is coming down about 3-1/2 feet on the other side.

(The point is made here that because of Attlesey's height he has to adapt his stride to fit the three-step interval.) (Kinsey) George Rider has raised the question of dragging the rear leg. Notice that he's bringing it up. (Duff) Compare this with the Dillard case where Dillard has to do something with that leg to keep it up, to keep it from coming down too soon whereas Attlesey with a short clearance has to bring it through more quickly in order to bring it down. (Kinsey) He not only comes down very close but he has a terrific falling action. That body lean will bring the lead foot down. The question has been raised here as to what you actually do with that lead leg; do you actually swing it down or does it just come down? I think it is right that if you maintain that body lean and you raise that leg up much higher than it can be raised otherwise, you don't have to do anything consciously about it; it will swing down by itself. But if you sit up straight, then it's possible to hold the leg up there, that's when you float. What did you do, Larry, whip it down? (Snyder) Jack Keller whipped his down; he's the only one I had who did. (Kinsey) Well, he had such a long stride he had to do it. How about Chic Werner? He's a hurdler. (There was some general discussion here.) (Beard) I didn't do it. (Doherty) I want to comment on Attlesey on that point. At the time Attlesey came to Philadelphia for the Inquirer meet, the newspapers commented on him saying that Attlesey emphasized this forward leg cut-down and Attlesey came to me during the meet. He wanted to make sure that I had it right, that he did not make any conscious effort to cut that leg down but rather his forward lean, the overall effect of his continuing on with his effort brought the leg down rather than any specific effort on his part. He was quite concerned that this should be understood.

(Kinsey) Here's a question I'd like to bring up in connection with this. While he's in the air he's losing momentum so that the moment he hits the ground he wants to pick up momentum. Now when he first hits the ground, his body is forward, his leg is forward. Now from that position, what motion can he make to increase his momentum? His leg is so far forward. A leg swing won't help his momentum, and an arm swing with the right arm won't help either. His body is so far forward that he has only a very slight contact with the ground. (There was some general talk here, interrupted by Ivan Greene.) I guess that uses up our time so we'll turn this back to Mr. Doherty. (Applause.)

(Doherty) Unless there are some important questions that you'd like to ask the panel, our time is gone and we do have these Olympic films to show. Of course we do want to give full attention to the hurdles. It is my feeling that Mr. Greene hasn't been given enough opportunity to talk on the high school level. We've been insisting on attention to that line so if there are any important questions I think we can take a few minutes for discussion. Tim Ryan has a question. (Ryan) I'd like to put up a question for critical analysis here and I think we'd get more here than we would in any group of high school coaches. I have a theory that the high hurdles are not spaced right for high school boys. I might explain that by saying, first of all, that we do differentiate in the shot put. We say, "You take a 12 pound shot, you're not mature. When you become mature, when you get to college, you can take up the 16." But we assume, at least if we follow the placement as specified by the rules, that the ordinary high school boy is capable of striding the same as a mature university boy. We place the hurdles exactly the same distance apart; we know if they are going to hurdle they must cover the distance in three

strides. And we also know that as a rule they aren't working on nearly as good a track as the university man is, a man who is bigger and stronger and more mature. But we do say that you must stride the same because you've got ten yards to cover and you must do it in three strides. I have a theory that we'd make better hurdlers for you people in college, we'd have fewer banged up knees and ankles if we cut down the distance a foot or perhaps a foot and a half and teach the boys to run smoothly and with rhythm in between instead of a short step, a kangaroo hop and pray to heaven that you get to the next hurdle without hitting it. (From the floor.) But that's why we have the hurdles three inches lower. (Ryan) That was one correction that we were tickled to death to get, but one correction doesn't necessarily cure all the evils. I have an idea, maybe I'm wrong, but I'd like to throw it out here for critical analysis. Could we do a better job if we would shorten that distance? I know I have to work like the devil for a long time with my boys to get them up to the second hurdle. (Lacey) May I make a comment on that? I believe in New York state and in a few other states too, up to about three or four years ago, we changed the distance in the low hurdles from 20 yards to 18 because of that point and we ran them about a year that way. Then we switched back, largely on the insistence of the college coaches. They were up in arms complaining that we were teaching boys to run seven steps for 18 yards and then they'd come to college and couldn't do seven steps for 20 yards. We were not teaching them to do the right thing at all so we switched back to 20 yards. If you switched the distance in the highs it would be comparable. I believe that in many states they do run lower high hurdles, don't they? Anyway, that's what happened in New York. The college coaches really cussed us out for making it 18 instead of 20 yards. (From the floor.) In one year, how did they know? (Lacey) Well, I guess they figured on what it was going to do. They thought it was all wrong; if a boy was going to be a hurdler he'd have to start by learning to take the right number of steps. (Ryan) I've watched state meets for many years and in the finals, the state finals, I have yet to see a race where everybody was running three strides in all high hurdle races. (Badar) Let's put it this way. When you get down to Class C and D your pick of boys to run the hurdles is pretty slim and if you look at the kid that runs, he's tight in the hips, he's about 5 ft. 3 or 4 inches tall, how do you expect such a kid to take three steps between the hurdles? That's the point right there. Unless the kid is 5 ft. 8, 9, or 10 you're just ruining the kid. He just can't do it. (Ryan) I have had some tall boys and I never had the feeling that I was ruining them when we ran 18 yards.

(Schlademan) I've heard this brought up time and time again in the clinics and I have a suggestion that I believe might settle it. I believe that it's all right in Junior High to shorten the distance between, but when a boy gets to Senior High school and is going to be a hurdler on the college level, if he's a little boy he just shouldn't be a hurdler because he's going to be a disappointment to his home town, to himself and to everybody else. So I would say, shorten the distance in Junior High, then step it up in Senior High and you already have the three inches taken off the top. (Snyder) Thanks, Karl. I agree with you and I also think that the instant you start to shorten the distances, the short sprinters start to go into the event and the event was made for the tall, gangling boy to strengthen him. It's the event that he goes into, that one or the high jump, the half mile or the mile. Not a sprinter, and the sprinters would dominate it. (From the floor.) How tall, Larry? (Snyder) About 6 feet or over. (You mean 5 ft. 10, like Dillard?) No, just because a boy is 5 ft. 8 or 9 and has speed, why force him to run hurdles? Don't count Dillard; he's one in five hundred. (Greene) This is the experience we've had in Cleveland. When the boys run in Junior High the distance is cut down; the boys run 18 yards and they don't run any high hurdles. The net result of that is that the small, fast, older boy is the one that wins the junior hurdles. The year that Dillard came up to East Tech. he didn't even place in the finals of the Junior High hurdles. I had the kid who won it the year Dillard came up, a kid named Kelly; he was about 5 ft. 5. We just couldn't make a hurdler out of him; he had to run extra steps between the hurdles. The temptation on the part of the coach to take the easy way out, to use this fast boy who matures quickly because he's small, and make a hurdler out of him because he's fast and can get through them, is to want to get the distance cut down. But I do believe that most high schools can find a boy 5 ft. 9 or better with a good split and then he can make the distance. It seems to me that I've had boys whose hurdling experience stretched their legs. When they started out they couldn't possibly make the distance so I shortened the distance between the hurdles and made them bound between the hurdles. Then I slowly kept moving the hurdles back toward the correct distance until they finally got it. Almost every kid who comes in from Junior High—I have such a kid right now. He happens to be six feet tall; he's young and neat and has the equipment to make the hurdles, of course. But he could make two hurdles and he couldn't make three. So we kept building and building. I shortened the distance for him.

(Ryan) Another thing I think we should keep in mind is that on a national average the terminal point of competition of over 60% of the boys is high school. (From the floor.) I think that Coach Lacey is wrong; I think the high school coaches set their own rules and they changed that because they found their kids crowding the hurdles. The committee doesn't have a college coach on it and they're the ones who set the rules. (Alec Wilson) What was the high school coaches' reaction to the change? (Greene) There

were two suggestions made, one to cut down the distance, to 180 yards, the other to cut down the distance between the hurdles. I was one of the few coaches who voted to maintain the full distance and also I was on the winning side to keep the 20 yards between them. I think most of the coaches wanted the full 20 yards between; the ten yard distance never even came up for discussion in Ohio. I have seen, I'd say, about a half dozen high school boys in Ohio, six feet and over, who were hitting hurdles and crowding them because they didn't chop down fast enough and get down to the ground quickly enough over the hurdle so that they couldn't rise off the ground for the next hurdle because they were right into it. (Q) Ivan, were you for the 220 yard hurdles? Yes, I was for it.

(Doherty) Gentlemen, I'm sorry to break in on this discussion. The problem is one that has concerned us for some twenty years and it is one for which we haven't found a solution yet. I can assure you, Tim, that this is a completely unbiased discussion and analysis of the problem but nevertheless we need to pass on to other matters. There are a few so-called announcements that we need to make; one concerns the loop films that we are using here. (Kinsey) Several people have asked me about the use of these loops. I'm going to send several of these loops to Rochester to the Eastman Kodak Co. and have reproductions made of them. In that way we'll be able to deliver some of them to some of you who may be interested in them. It does require a minimum charge of ten dollars on each order so I can't get them on my own. Unless there are other people interested in having them I won't be able to do it. That suggests to me that it might be a good idea if the NCTCA might consider the possibility of having pictures taken of people in the various events and then having reproductions made of them at cost. One roll of 100 feet would cost about the same as commercial film but then you would have pictures of all the great performers. I'd suggest that the NCTCA should see what they might do about the films. (Doherty commented in favor of the idea.)

(Rider) There are two announcements I'd like to make, to get an opinion. Two years ago the NCTCA put out All-American certificates for those boys who were selected on the All-American team, three men in each event. We have mailed certificates to the boys in each case but the schools have never received a copy. It was my opinion and a lot of others' that the schools which were fortunate enough to have an All-American would like to have one of these certificates to hang up in their archives. Now it seems that the finances of our organization won't permit our sending out two of these certificates, one to the boy and one to each institution. I think, however, and I'm sure most of us will agree, that by paying for the cost of an extra one, the school should get one and I'd like to have a show of hands of the college coaches who would be willing to pay for the cost of a certificate in order to have one for every boy who makes the All-American team. Perhaps we'd better put it the other way. Are there any college coaches who wouldn't be willing to pay for what it costs. (Laughter.) There's one other thing I'd like to say—that was just for information. In the last few days I've had the opportunity to talk to some of our shoe manufacturers relative to spikes for shoes. Now as you all know, all the different varieties of track shoes made have different spikes so that you can't change from one make to another. I'm sure that if our association would go on record and recommend that the manufacturers should get together and decide which cleat we want, socket and all, we could get some action. They were about ready to agree on it right now, three of them I talked to this morning were quite willing if we can get together and decide so that if you have part Spothilt, part Spaulding and part some others, your cleats will fit all of them if you want to change. Think about it so that we can get some action in our June meeting. It won't do any good this year but for next year we might get together. I just wanted to raise that question because it is a mess for some of us who use more than one type of shoe and have to have a supply of nuts and three-quarters and full-length spikes and then not be able to use them interchangeably.

(Doherty) Before we leave this panel on hurdling I think it is very much in order to express our appreciation to these men. It may seem like a very simple process to bring these loop films in but when you figure that these loops have been pulled out—I heard Dan say that he had gone over thirty rolls of film in one case in order to get certain material—it means a lot of time spent not merely here in the last 24 hours, but in the last month or so preparing it and I think you will join the chairman in expressing our appreciation to them. (Applause.) Now we have these Olympic films, four reels, about twenty minutes per reel, eighty minutes. I've just been looking at them and I have the feeling that in terms of events perhaps two of the reels are preferable to the others. If we leave out two of the reels we are eliminating the 110 meter hurdles, but I think the other events are of lesser interest. The first reel that I have here contains the shot, 100, 10,000, high jump and broad jump, which I think would be a very interesting series. We might throw that on first. The second reel has the 800 meters, pole vault, discus, hop step and jump, javelin and 200 meters. So we'll begin there. Otherwise I think we can now assume that the clinic proper is over and that you are free to go as your time may demand. Once again, however, I'd like to express my personal appreciation to George Rider here of Miami, who did a great deal of work in the local area in getting men, suggesting places, etc., and also to Art Reisner who took care of all the local difficulties in getting the help of the schools, this opaque projector, etc., and the men in this area who deserve special commendation. (Applause.) Some of you who were not here this

morning may not know that our entire discussion is being tape-recorded. Out of these discussions will come certain materials, not all of it, of course, but certain important aspects which will be available for you some time in the next twelve months.

(There was some informal discussion here about loop films, their availability, price, etc. Dan Kinsey asked anybody interested to write to him at Oberlin.)

(While the films were being set up, Les Eisenhart took the floor to display an automatic timing device which he had invented, intended primarily to allow boys to take their pace workouts without the aid or presence of the coach. The timing device can be set at any point between 50 and 70 seconds. A warning light goes on before the bell rings for the pre-set time thereby helping the boys to adjust their pace. It was recommended for high school coaches who rarely have assistants enough to give personal attention to the entire squad. The present cost was given at about \$40, but Les thought the price could be reduced on a production basis. There was applause, after which the Olympic films were shown and the meeting adjourned.)

DINNER AND COACHES' MEETING, THURSDAY JUNE 10, 1954, ANN ARBOR

The coaches, along with the officials and invited newspaper men and friends, assembled at the University of Michigan Golf Clubhouse shortly after 5:30 P.M. Dinner was served buffet style, the guests seating themselves at long tables on the porch and the lawn facing the golf course. Fortunately, the weather was perfect for the occasion. After dinner Coach Don Canham of the host institution greeted the assemblage briefly and then introduced Athletic Director H. O. (Fritz) Crisler. Mr. Crisler, after welcoming the coaches and guests, spoke briefly about the early days of the National Collegiate meet and reminisced about his association with A. A. Stagg at Chicago. He then introduced the Referee of the meet, Ralph Young, retiring Athletic Director at Michigan State College, and presented Mr. Young with a Michigan Varsity "M" blanket. Mr. Young also spoke of the old days, of his experiences during World War I, his stay at Michigan and of his track-coaching days at Michigan State. Don Canham then introduced Kenneth (Tug) Wilson who was to make the presentation of medals and trophies at the meet. Mr. Wilson spoke briefly as NCAA head and chairman of the Olympic committee. After a few announcements by Canham (the clinic, the coaches' business meeting after the drawings, etc.) the coaches moved indoors for the drawing of the heats.

Coach Jim Kelly of Minnesota presided. He first introduced Coach Brutus Hamilton of California speaking for the Rules Committee. Mr. Hamilton read the newly formulated suggested rules for the conduct of the NCAA meet. Coach Larry Snyder of Ohio State reported for the Games Committee. He recommended two changes in the published time schedule. The first put the semi-finals of the High Hurdles before the Low Hurdle trials, or in other words, reversed the scheduled position of the two events. The schedule now reads:

High Hurdle heats at 5:40; Semi-finals at 6:20.
Low Hurdle heats at 7:05-7:10; Semi-finals at 7:55.

In case of darkness or bad weather, the semi-finals of the lows would be run on Saturday afternoon.

The second change would apply the same procedure to the 100 and 220 yard dashes, the recommendation being that the semi-finals of the 100 precede the preliminaries of the 220. The schedule now reads:

100 yard preliminaries at 5:20; Semi-finals at 6:00.
220 yard preliminaries at 6:55; Semi-finals at 7:40.

The meeting then proceeded to the scratches in the mile, followed by the setting-up of the heats in the 440. The session closed at 10:20.

MINUTES OF THE NCTCA MEETING HELD JUNE 10, 1954, AT ANN ARBOR

Acting Chairman George Rider of Miami called the meeting to order at 10:25 P.M. The chairman explained that President Al Moreau had been prevented from attending the meeting by a death in the family and that Vice-President Ken Doherty was in England with his Pennsylvania track team, and that he had been asked to preside. He announced that the clinic would begin at 9:00 on Friday morning and last until noon.

The Chairman announced that a nominating committee had been appointed earlier in the afternoon, the members being Gordon Fisher, Chairman, Wilbur Hutsell and Clyde Littlefield. Gordon Fisher reported for the committee. The slate nominated consisted of Ken Doherty of Penn for President, Payton Jordan of Occidental for Vice-President. At the express wish of Bill Easton to be relieved of his duties, the committee, after careful consideration, had selected Fran Dittrich, assistant coach at Michigan State College and secretary of the Western Conference Coaches, for the secretary's job. Tom Botts moved acceptance of the report and election by acclamation. Easton cleared the way by moving the nominations closed. Seconded and carried. Eastment seconded the Botts motion and the slate was elected unanimously.

Schlademan asked information about dues, etc., explaining that he was acting for Dittrich who was absent on duty as a reserve officer. Bill Easton answered, reporting that Track and Field News now costs \$2.25 instead of \$1.50 as heretofore. He suggested the possibility of raising associate memberships (high-school coaches) so that all memberships would be \$5.00. He also recommended that four advertisements be included in the Clinical Notes instead of the usual two as a means of increasing income. On question, he said that the organization had over \$300 in its treasury. The chairman asked for action on the \$5.00 associate membership. Oelkers so moved and Wilson seconded. In the discussion that followed, Easton suggested that the dues might be left at \$3.00 without Track and Field News. Snyder thought that the high-school coach should not be loaded with Track and Field News, but that he would be helped by the Clinical Notes. Easton said that the object is to get more members and that would not be accomplished by raising the dues. Oelkers asked for permission to withdraw his motion; the

second agreed and the motion was withdrawn. Snyder moved to continue one more year at \$3.00 for both dues and Track and Field News for high-school coaches, and \$5.00 for regular membership. Seconded and carried.

The chairman announced the appointment of an auditing committee to go over the treasurer's report. The members are Larry Snyder, Ralph Higgins and George Gauthier.

Wilson asked why the rules as set up by the Rules Committee had not been followed. He suggested that the National Committee should set up the rules for the conduct of the meet. Giegengack moved that the findings of the Rules Committee should be binding. Snyder explained that Hamilton always called them "suggestions," not rules. Easton asked why the Games Committee should not set up the heats. He said that definite entries including scratches should be in before the last week and that the heats could be set up in advance of the meet. Snyder argued against letting control of the meet get away from the coaches. Schlademan suggested the possibility of a skeleton heat set-up. Giegengack spoke about the changes often made by coaches after scratches, etc.; he was definitely against this maneuvering and thought the Rules Committee could do an objective job. He then moved that the decision of the committee should be binding as to the number of heats, semi-finals, etc. In the discussion, two questions were asked: (1) When does this go into effect? (A) Next year, 1955. (2) Does this mean that the committee sets up the heats? (A) No. It sets up the method of conducting the meet, just as it did in the outline distributed among the members. Wilson seconded and the motion carried.

Schlademan talked about late entries. He said that in conducting the National Cross-Country meet, Michigan State had not accepted any late entries since the first year. He moved that the rules as to the closing date of entries be enforced and no post entries be accepted, the postmark date being decisive. On question, Schlademan explained that Michigan State sends out a preliminary questionnaire asking if the school would have any entries. On receipt of an affirmative answer, entry blanks are then sent out. In clarification it was agreed that any man originally entered in the meet might later change events. Giegengack seconded and the motion carried.

Easton reported on a problem confronting the cross-country coaches in general and Schlademan in particular. He said that all the coaches liked the East Lansing set-up, that the location was fine and the handling of the meet excellent, but that there is now a movement afoot to change both the location of the meet and its character. He asked Schlademan to tell the story. Schlademan said that the NCAA Cross-Country meet had been held in East Lansing on the Michigan State course since its inception. An expense check for the program, etc. has always come from the NCAA although Michigan State has always spent more than it received. Two years ago the executive committee of the NCAA suggested that the amount of expense money be cut down and an agreement was reached on this basis. Now because of disfavor, there was a movement to move the meet. Last year Wilson reported to Schlademan that the NCAA would no longer help to pay the expenses for the meet. Schlademan wrote to Byers telling him that Michigan State would hold the meet this year regardless of the expense money. He sent a copy of his letter to Easton and the latter also wrote to Byers in protest. There was a suggestion made that a 50 cent entry fee per man be charged and then another 50 cents per man on appearance at the meet but Schlademan emphasized the fact that the problem was not the money but rather pushing cross-country into the background. He said again that the meet would be held at Michigan State this year regardless of the expense.

The chairman asked the coaches for their opinions about the entry fee. Easton spoke about the NCAA "kicking cross-country around." Gauthier said that in his conference, a \$2 entry fee per boy is charged, and suggested that the same could be done in the NCAA meet. Botts suggested \$1 plus \$1. Rider asked if the fee might not keep out some of the smaller schools. The consensus was that the effect would be negligible. Giegengack moved that an entry fee of \$1 per man be charged with no extra charge for the men in the meet. Gauthier remarked that the coaches got much more than the dollar in entertainment. There was no second. Gauthier moved a \$2 fee with no addition. No second. O'Connor moved \$5 for individual, \$10 for a team entry. No second. Giegengack moved that this body ask Michigan State to discuss the problem of entry fees with the NCAA and report back at the next meeting. Littlefield seconded and the motion carried.

Giegengack suggested that one reason for late entries was that the blanks were often sent to the athletic director's office and then did not reach the coach in time. He thought that entry blanks should be sent to the coach as well as the athletic director.

The meeting was adjourned at 11:15.

Respectfully submitted,
Phil Diamond,
Recording Secretary

CLINICAL NOTES, NCTCA MEETING HELD IN ANN ARBOR, JUNE 11

The meeting got under way at 9:15 with George Rider in the chair. Just before he called the group to order, Bill Easton, the outgoing secretary, offered the following: "You high school coaches who have just come in, we are offering you an associate membership for \$3 which entitles you to 'Track and Field News' which would ordinarily cost you \$3, plus our 'Clinical Notes' so you can't afford to pass up this bargain. You can get both publications for the price you ordinarily pay for 'Track and Field News' alone. In the absence of our new secretary Fran Dittrich, Phil Diamond is set up here ready to accept high school coaches' memberships and Karl Schlademan will take care of the college coaches. So don't be bashful, step up and pay your dues and these men will issue you receipts." There was a ten minute pause while new members were signed up.

(Rider) Gentlemen, I suppose some of you know why I'm sitting here as chairman of this meeting. I suppose it's the penalty for having been President last year, but in the absence of our president, who had a death in his family, and in the absence of our Vice-President, I've been asked to conduct this clinic. So first of all I'd like to read a letter to you from Ken Doherty, our Vice-President. I think it brings up some very good points. "May I first express my regret at not being with you this week-end in Ann Arbor. That the greatest day in Michigan track history should find me in England with our Pennsylvania track team is a real blow. Fine as the trip is, I personally would rather be in Ann Arbor today. Secondly, I'd like to express my appreciation to George Rider for serving in my absence at my request as Chairman of the NCTCA clinic. In my opinion, clinics such as this are extremely important for the future of track and field athletics in the United States. The necessarily rapid development of our sport can no longer depend on just common sense and trial and error methods of coaching that have succeeded so well in international competition up to this time. The challenge of the other countries in the coming Olympics will force us to step up our methods and increase our effectiveness far beyond what we have done in the past. Clinics such as this should be an essential part of such improvement. It is my opinion that the January 1954 clinic that the NCTCA held in Cincinnati was an excellent beginning. At that time, outstanding coaches followed tradition in stating what worked best for them. Such statements are invaluable, of course, and should continue to be a major part of our track clinics, no matter how scientific we may become. But in addition, at Cincinnati there were improved methods of presentation of these ideas. In the high jump, for example, a panel of three coaches spent several pre-clinic hours discovering common fundamentals as well as differences of style of five of our greatest champions in the high jump. Loop films of these men were run repeatedly through a projector which throws two frames per second on the screen or can hold a single frame indefinitely. Having pooled their ideas, these same coaches then presented their conclusions and the loop films later that afternoon to the assembled coaches. Similar methods were followed in presenting the hurdles, the sprint start and distance running. But we need to go beyond even such efforts for there are basic problems in Track and Field which cannot be answered in such ways without being wasteful of both time and energy. Even such a simple problem as the proper placement of starting blocks is not one that each individual should work out for himself. Rather it is best solved by such careful research as that of Dr. Franklin Henry of California. Again, physiologists are unanimous in stating that even pace in distance-running is best yet even the four-minute mile was not run at such even pace. (Not very far off, I might add, though.) Are there then certain mental-emotional factors in fatigue which physiologists have not sufficiently considered? And are not these factors most likely to be clearly understood and utilized through scientific research? Or yet again, to quote one of our most respected coaches, the most difficult problems in coaching Track and Field are primarily mental in nature. Should not we coaches then give as much consideration in our clinics, in our textbooks, and in our practice to training attitudes and emotional control as we now do to training the body? In my opinion, questions such as these are best answered by men specifically trained in related sciences, in individual and group psychology as well as in body mechanics and physiology. So today we hope that a new level in Track and Field clinics will be achieved. The experienced thinking of our own coaches, trainers and athletes will continue to be the invaluable core of our efforts. But in addition we shall use principles of related sciences whenever possible, rather than mere opinion as well as the most modern of film projection equipment. And finally, we shall be the first NCTCA clinic to benefit from the thinking of a scientist trained in psychology who is on our program today. All in all, it should be a most interesting and most valuable session. Thanks again for doing my work for me." Signed, Ken Doherty, vice-president of the Track Coaches' Association.

Now I think that you are all more or less familiar with the program set up. The first item on our schedule is concerned with the use of hard surfaces, asphalt, to be specific, on our runways. Since we are covering a great deal of ground here in a short time, I'm going to be compelled to ask our speakers to try to stay within the time limits and we have allowed 15 minutes for this first part of the program. The first speakers on our program, therefore, are men who have had some experience with asphalt runways and I will present them to you at this time. Larry Snyder of Ohio State and Dave Rankin of Purdue. They have both been using these hard surfaces this year and in these few minutes we would like to have

them tell us all they can about them. I might suggest that Ed Weir, who is sitting over here, is the first man in this country, to my knowledge, who experimented with hard surfaces for jumping pits and runways. The National Collegiate was held at Lincoln last year and we high-jumped off this surface with pretty fair success, I think, or at least they jumped pretty high. So now we'll turn you over to these men who will tell you all they can about hard surfaces. Larry, do you want to start off?

(Snyder) Well, I'll start off by introducing Dave Rankin, whom you all know. Dave did a lot of research on this and I won't take any more time now. Dave will be our spokesman and if he wants a word from us we'll be glad to pitch in.

HARD SURFACES

Coach Dave Rankin, Purdue University; Larry Snyder, Ohio State, and Ed Weir, Nebraska

(Editor's Note: This talk has been somewhat shortened to eliminate duplication of the material given at the January clinic.)

(Rankin) These surfaces, as you have heard, were first put in by Ed Weir at Nebraska some years ago. We put them in in the fall so that they would go through the winter and we could find out how they would hold up. We did the pole vault, the high jump, the broad jump, the discus and the shot put. Our hope was that when we took the team out the first of April or the latter part of March that we could take the entire team out to the field and not have the running events outside and the field events in the field house so that we'd have to run back and forth. Over and above that, the fine thing about the surfaces is that there are no maintenance problems. At Purdue we now have a man who comes out in the morning and brushes and rolls the track and then leaves. That's about all there is to it now and it's not hard to get a groundkeeper to come over and do that part. Previously, we used to have to get a man to fix this runway and that runway and I usually ended up by doing it myself. (Here follows a description of the areas covered and the materials used.) -----

As to the matter of the time it took to put in the 3,335 sq. ft. we used, it took one day to put in the crushed rock, one day to put in the asphalt binder and one day to put in the fine mix. One point is that once they start to put in the fine mix, they should finish it, that is, see to it that they don't put in half of your pit and then decide it's quitting time and go away and leave it. It's hard to bind it up the next day. So once they start on one of your surfaces, they should complete it. Another point is that this hot mix is much easier to work if the day is warm; it's put in at somewhere around 425 degrees so you ought to put it in before the weather gets cool. As I said, we found out that the surfaces were easy to maintain. We also found out that the proper spike to use is the board spike, a one-eighth inch length. We found out that if you use the indoor spike the friction is good enough and the runways will hold up well and not tear up. In the Conference meet, in both the shot and discus, we used the rubber-soled shoe. We made a mistake one day in one of our meets and put some dirt on the surfaces so we had to take a broom and a pail of water and scrub it down good so that the dirt didn't roll around under the tennis shoes. But after that we had no trouble at all with the turns in the discus. We even put one of those cocoa mats next to the circle so that the kids could wipe their shoes off before they got on to the macadam mat and there wasn't any trouble in either the shot or the discus. As far as the high jump is concerned, you high school people as well as the college people, we've had boys who jumped in the rubber-soled shoes, the little black Keds with the crepe soles and they had no difficulty. The same is true of the pole vault; in a great many of our practice sessions we used the rubber-soled shoes and there was no trouble with the run or take-off. One of the nice things about the hard surface is that when the meet starts the step always remains the same. You no doubt have had the experience that the soft runways eventually get chewed up and the kids have to change their steps at the higher heights. We don't have that trouble at all; once you have your steps, they will hold throughout the meet. Another thing we did: when we put the circles down for the shot and discus, we just bored holes in the rings and put down large spikes, about five or six inch spikes, and just nailed them right down through the asphalt and when it came time to take the rings up and put them away for the winter, we just pulled up the nails out of the hole. The nails might get a little bit loose and come up a little but they don't get loose sideways and allow the ring to move. That was one of the things I talked about at the winter meeting; we weren't sure then as to how we were going to put down the rings on the asphalt surfaces. We have done that and haven't had any trouble with the rings moving sideways. As far as the rules are concerned, the rules have all been checked. The only thing we found was that the hard surfaces, the asphalt take-offs, can not be used for Olympic competition. That's the only rule that might bother you but I don't think most of us are planning on holding the Olympics on our track. Larry, would you like to say a few words?

(Snyder) Very briefly, I suggest that if you have any idea of putting this black-top on, that you immediately get in touch with a good highway man in your territory. We're fortunate there at Ohio State in having the highway testing lab right on the campus. I contacted the superintendent of that and he

immediately started working on Dave's formula which he had sent to me and which Ed (Weir) had sent to him. We changed it a bit; we reduced the amount of asphalt from 8% to 6%. Instead of using the various types of sand they used there, we used straight limestone sand. We didn't put the asphalt base of the rock and stuff underneath it because our highway man said that in our climate, all we needed was two or two and a half inches of the top layer of the black-top, so we just graded off the top of the runways that we had, cinders, and we had a pretty fair base under that—he said that's as good as anything you can get—so we just added the sand and asphalt on top of our old runways which we had lowered a little bit in order to conform with the grade rights. The whole operation at our place took about five hours, that is, the laying of the black-top. We had prepared the runways prior to that; we hired an outfit, a laying machine, from a black-top outfit downtown and they charged us \$50 for the machine plus a supervisor. He came up, the black-top started rolling in in big trucks and they started laying it. This supervisor who came along with the machine had brought some steel plates along so that he could put these plates in the machine which would normally lay a strip about 12 feet wide. He was able to cut that laying distance to any distance he wanted so our broad jump runways are about 5 feet, the pole vault about 5 feet; he just put these plates in the machine and laid a 5-foot strip. As I said, in a five-hour operation we had the whole thing in. So far it's been very satisfactory; we haven't had a winter so we don't know about that phase of it. Laz vaulted 15 ft. 2 on the pole vault runway; we've had good discus throwing and shot-putting. The broad jump is possibly the one event where they might not equal what they might do with long spikes. There is something possibly in the idea of a long spike in rocking up on the board that might help broad-jumping, something which you might lose with the one-eighth spike. We don't know that because there were no great broad-jumpers in the state and none on the teams we were meeting, but one high school boy did jump 23 feet which would indicate that it's probably just about the same as the previous type of runway. Ed, how about you? Ed Weir of the University of Nebraska, the first man to put in these runways.

(Weir) Our first experience several years ago was that the high jump did crack up so we went into it a little more thoroughly and our last surface has gone through the winter successfully. We've gone in between these two gentlemen; we've put down a three-inch mat and a half-inch coating on top. As to what you put down, I don't think it will make a great deal of difference; you know the climate you're in and the location. I want to say particularly, however, that this is not near as big a job as some of you might think. One thing you should definitely do: link up with some contractor or perhaps your city engineer and find out sometime during the season when he has another job close by. In many cases he will be able to link up your job with another one and it won't cost you much of anything. This is especially true if you have the groundwork all done, lay out what you want done and the asphalt mat can easily be slipped in there, at least for the high jump and your shot and discus circles. So get together with your local city man who understands what has to be done and has another job close at hand. Some of you might wonder what to do if you have to repair it if it does crack up a little. Now we haven't had to repair our last one but you can easily do it. Cut out a square, use a little of that dope to clean it out and it's easy to put a mat on top of the original mat if you ever have to repair a take-off spot. I don't know what more I can add unless any of you have some questions. This isn't anything particularly new. As far as we are concerned, we started because of the weather and because in the spring we didn't have much chance of working our men together. It just happened that we stumbled on to it through an old road we had to keep the school buses from miring down at football games. It was just a place to run these buses in on and our boys liked throwing on it and kept insisting on going over to this corner of the practice field because they had good footing there. They liked it so well that we decided to experiment with it and that was some eleven or twelve years ago. The first one did crack up but that was due to the wrong mixture, but if you use this formula and an asphalt man who knows what he's doing, it's not near as big a job as a fellow might think.

(Snyder) I'd like to add one more thing. We made one other change in the formula; we went to a 70 to 80 penetration oil rather than a 60 to 70 that Dave used and that was on the recommendation of our highway testing man. He also made the comment that during the summer, on any hot day, we could get a five-ton roller and run it over our runways and he believes that it would take out all the marks that are in there, seal it right up just by running a roller over it again. Thanks very much.

(Rankin) One other thing I was thinking of: at the winter meeting the idea was brought up that to save money you could have part of the runway asphalt and part cinders. If you do that I don't think you will have accomplished your purpose; you'd be better off to use one or the other, either the cinders or the asphalt. As far as the mix is concerned, the purpose of the blow sand was that you won't have any large pebbles in your runway because a spike might catch it and throw it out and then you'll have two holes in place of one. When you get through with the runways and run the roller over it it really looks nice, and after the boys start running on it, after a month or so you might think this looks bad because of all the holes in it. But you still have a good surface regardless if it happens to be chewed up in any one spot such as the take-off of the high jump. The base is still there and is hard and firm so you don't need to get worried about that part of it. Before we close, are there any questions? I have all the material but

I didn't bring it with me. I made up a sheet telling what we went through and the problems you have to think about and I'd be glad to send it to you if you'll write me on it.

(Gauthier) I'm from Ohio Wesleyan and I'd like to give you just a word about our experience. We installed in one day two inches of the asphalt on our cinder runways which we had all over the place, that is, we had about 125 feet for the broad jump and 125 feet for the pole vault, two shot put circles and a discus circle. We had concrete curbs and about 15 inches of cinders which we had used in the past. We put the two-inch asphalt on top of it in one day and we used it for a track meet the next day. We have used it for two big high school meets, one of them with 1200 boys competing and the other with 500 boys, for the Conference meet and another all-state meet besides the dual meets this season without ever touching them after they were laid down. Now the total cost was only \$350 for all of the runways, the high jump, two shot put and a discus circle in our place and we had a local asphalt man put them down. We think it is the finest thing we have ever done for the improvement in carrying on our track meets and with the weather we've had this spring it would have been a terrible mess on the field for the field events with the number of boys that have been competing. It's one of the greatest things we've done.

(Rider) Thanks, George, and thanks to you gentlemen for telling us about the hard surfaces. Our time is going along fast. I'm sorry that we don't have any more time to discuss this. If any of you have questions you want to ask, here's Dave Rankin's address. He'll send you copies of the formula and you can certainly ask these men who have talked this morning about their experiences. It certainly looks like something that will save us a lot of maintenance difficulties.

Now I think that we are most fortunate this morning in having with us one of the best trainers in the country to talk to us on the "Treatment of Track and Field Injuries." Mr. James Hunt is the trainer at the University of Michigan and I'm very happy to present him to you at this time.

COMMON TRACK INJURIES AND HOW WE TRY TO CORRECT THEM

Jim Hunt, Trainer, University of Michigan

(Editor's Note: The following was not taken directly from the tape. Because of the fact that Jim used illustrations, skeletal feet, a subject for demonstrating bandages, etc., he thought it best to re-write his material.)

Let's start the discussion with the pulled hamstring, a muscle spasm at the back of the leg. It causes the runner to pull up suddenly, he isn't able to continue in a race and he may be laid off from a week to the entire season. I should like to explain our reasons for adopting the procedure we use, so first I'll tell you what I can about a muscle. It is a physiological law that like tissues respond the same to any stimulation, no matter where they are in the body. Muscle tissue in the foot, in the leg, in the face or arm, all respond the same. This is true of nerve tissue and also of bone. When any of these tissues is injured it is going to react the same, regardless of where you have it. Consequently, you do not treat a charley horse (a myositis) in the thigh differently than you treat an injury in the back of the leg or in the calf or in the biceps of the arm.

A muscle fiber is quite small. The average is about an inch long and one five-hundredth of an inch in diameter. It has its own venous and arterial blood supply, lymph, and nerve supply. Each fiber is covered with an elastic tissue sheath. These fibers are gathered into a bundle which in turn is covered by a sheath. The ends of the sheaths form the tendons. The tendons, composed of connective tissue, are the non-working parts; their function is to transmit the pull of the contracting cell or fiber to the bone and concentrate much power in a small area. In the physiology of a muscle, a stimulus to one muscle or a muscle group causes a contraction in that muscle group and simultaneously, another stimulus is received by its opponent, causing relaxation. That fact is important when you consider the action of the muscles involved in the hamstring pull.

Pain in a muscle is the result of an injury; muscle fibers are torn and that releases blood and lymph into the injured area. Actually, as the result of the tear there will be a "hole" which will fill with the released fluid. The liquid will continue to flow until the pressure it exerts equals the pressure of the driving force, the heart. Nerves have been injured and exposed. Pain results when a movement of the muscle causes pressure on the fluid depot which in turn presses on the injured nerve fibers and you feel pain. This condition is called a hematoma. Healing will be retarded in this area until the exuded fluid is all absorbed.

To identify the injured tissue, it is necessary to get the history of the injury. First ask, "How did it happen? Was it a blow? A twist? Or did it just come without any cause that you know?" Ask the boy to point with one finger. Usually he will cover an area with his whole hand but if you ask him to use one finger you can come close to the real site of pain, especially if the injury has just happened. If the examination has been delayed fifteen minutes, the whole area may be involved. You must find out all you can as quickly as possible. Have him describe the pain; is it a sore spot? Does it burn? Does it sting?

Each question has a meaning. A burning type of pain (and the stinging type too) indicates injury to a nerve. Look for deformity in the area, swelling particularly. In the muscle pull you have bleeding, the extent depending on the size of the blood vessel. You seldom see evidence of the bleeding for several days until the blue color gets to the skin, due to the fact that the injury is generally quite deep. Bleeding must be treated for if the injured area is hot, also if the muscle seems larger than usual, if the muscle is stiff and is no longer easily pliable. Rigidity in the muscle may be a spasm but the spasm may be caused by bleeding. After you know the history you can start to identify the tissue or muscle. Give manual resistance to the action of the individual muscles. If pain is caused by one movement—and not another of the same limb—the identification becomes easy. Let me caution you—do not repeat a painful movement if it is possible to avoid it.

We know several causes for the muscle pull. One is muscle in-coordination. Perhaps one cause is that the rhythm of the man's movement was broken by his attention being distracted just enough to cause a hesitation or a change in his stride. Something prevented the relaxation in the antagonist muscle when the other was stimulated to work. If a boy hasn't an adequate water intake to maintain the water balance there may be chemical changes which may affect him.

In order to maintain circulation, the blood must be driven out of the muscle by the contraction of that muscle. When you have contracted the muscle to its capacity, you have driven out most of the blood. When the muscle relaxes, fresh blood comes in and repair of tissue is the result. Now, if this relaxation period is so short that an adequate supply of blood cannot get into the muscle, a spasm or cramp will result. If this condition is allowed to remain or if it is repeated, often degenerative changes will take place in the muscle that may not be reversible.

Now for the treatment for the muscle pull or cramp. The immediate treatment is to stretch the muscle and to supply cold packs or use ethyl chloride for chilling. The purpose of stretching can be illustrated if you will imagine a cloth rope put into a bucket of water. The water will penetrate into every space between the fibers. If you remove the rope from the water it will remain wet and soggy for a long time. But if you stretch the rope with great force, water will fly out in all directions because the stretch will reduce the size of the inter-fiber spaces, thereby forcing the water out. If you consider the injured muscle as the rope and the blood and lymph as the water, you can see that you can force the blood from the inter-fiber spaces by stretching the muscle or by strongly contracting it. And by maintaining the action you can prevent the return and the consequent coagulation of the blood in the injured area.

The technique for identifying the injured muscle is as follows: have the boy lie face down, relaxed. Grasp the foot, rotate the leg till the toes point inward. Have him bend his knee; you will feel and see the outside muscle, the biceps, contract first. If the movement does not cause discomfort, rotate the foot out and have him bend his knee. This movement contracts the inside muscles. Either or both movements will produce a spasm in the affected muscle. We use two methods to reduce the spasm. One way is to stretch the muscle and hold it until it fatigues. We follow that plan when a boy has a cramp on the football field and usually at the end of the time-out period he can return to play. I used this as an illustration to show that a cramp or a pull can be controlled, even though you could not return a track man to a race. Our treatment, when it is possible to do so, is to combine the stretch treatment with cold packs or an ethyl chloride spray.

Now due to the fact that the muscle was without adequate blood supply for the duration of the spasm or cramp, a great number of muscle cells have died. The parts of the muscle still able to function will do so but greatly handicapped by the dead cells and accumulated waste products with the result that the muscle will be stiff and painful. Our purpose in further treatment will be restoration of circulation and function.

Delay the application of heat until the temperature of the injured area has returned to normal, indicating the control of hemorrhage. This may take twenty four hours or longer. After our heat treatment of twenty to thirty minutes we use an electric muscle stimulator. This is not a vibrator but a machine to actually stimulate the individual fibers electrically just as the brain would stimulate them, causing the fibers to contract rhythmically and thereby bring about improved circulation. We have another reason for the use of this device, that is, to re-educate the muscle—or perhaps to re-educate the brain to use the muscle. When the athlete can contract the injured muscle voluntarily we have him move the limb against manual resistance. When he has regained control of the muscle we cut down on the time of electric stimulation and increase the resistance.

The bandage that we generally use for injury in the upper half of the hamstring is a wrap-around. Have your boy stand on a low table or a firm chair with his leg slightly flexed. (If you are willing to kneel, he can stand on the floor.) Place yourself in front of him. Start with a full roll of two-inch adhesive tape. Draw out enough tape to go around the leg. Place the middle of this strip about one width below the injury. With quite a bit of tension, draw the ends straight forward (toward yourself) until you have half encircled the leg, then tip obliquely upward at about fifteen degrees (two o'clock) and lap over. Repeat, overlapping each strip halfway until you are one width above the injury. This taping is usually

six to eight inches wide. You have done a good job if the tape is very tight when he extends his leg and without pressure when he flexes it.

Now I'd like to talk to you about a few common foot conditions. Consider the pronated foot. The lad with the pronated foot is more likely to suffer from shin splints. These fellows are good runners but when they run the foot is in good position. The pronation occurs when the boy is tired and when he is walking or jogging. Just look at a few feet critically and you will see a foot with the fore part turned out. The heel is tipped in and the first metatarsal head projects slightly and the skin is reddened over the head. If a band of two-inch adhesive consisting of two or three strips is circled about the arch with the pull up on the inside, some of this pronation can be remedied. If the condition persists and causes pain, the tape should be brought across the ankle and anchored on the outside of the shin. Pull up on the inside of the foot with the foot slightly inverted. When a boy has reported at the time he first feels the onset of shin splints, he is taped with the last-mentioned method which we call a long arch taping, and in the great majority of cases, the condition disappears. A further stabilizer for the pronated foot is to start a strip of tape at the base of the big toe or just behind the first metatarso-phalangeal joint, bend the fore part of the foot in slightly and draw the tape horizontally back around the heel and forward to the middle of the fifth metatarsal bone. Repeat this and anchor around the foot. If the shin splints are not reported early, it will take some time.

The foot is a very complicated mechanism and many things can go wrong with it. Look for a foot with a short big toe. This condition is called Morton foot. Many times a foot will become painful at the base of the second and third toes due to the fact that these two toes are longer than the big toe and so must carry more strain than they are built to carry. By padding under the ball of the big toe, the metatarso-phalangeal joint, enough of the load will be taken from the smaller toes to relieve the pain. The condition known as metatarsalgia is a painful metatarsal. It may be the second, the third or the fourth, or it may be two or all three. The condition is caused by pressure on the ball of the foot, actually by bad bone position. It can be dramatically relieved by placing a pad immediately behind—not on—the painful head. The pad we use is a rectangle composed of sixteen thicknesses of two-inch roller gauze (44x36 mesh) cut in 1" x 2" pieces (16 thicknesses is four folds). This pad will prevent blisters on the top of the joints of the toes, a condition also peculiar to track.

I have been asked to tell you something about our heel cup. It has been developed to relieve the painful heel condition found in broad jumpers, high jumpers and others. It is made of laminated glass cloth with a mixture of resins. Each cup must be made for the individual who is to wear it. We first make a plaster cast of the heel. Then we pour a mold and it is over this mold that we build up our heel cup. It is necessary to dry the cup on the mold for twelve to twenty four hours. Then we shape it, fit it, make adjustments (this is seldom necessary) and the athlete can go out and jump or run immediately.

There are plenty of other conditions which we work on in track that ought to be discussed but time is limited. With only a few minutes left I know you will be unable to ask questions of me but I will be available all day today, until ten o'clock tonight and all day tomorrow. Thank you. (Applause)

(Rider) I'm sure you will agree with me that science will help us in our training procedures and that's what we're trying to point out all the time. Thank you very much for a very fine presentation. A couple of announcements now.

(Easton) Fellows, Don Weir has asked that any of you fellows who would like to have transportation from your present quarters to either the airport or train, to fill out one of these cards and if I can get some of you younger men to pick them up and pass them out. Put on that card your school, your name as the coach, where you are staying at the present time and where you'll be going and the number of persons, they will appreciate it very much and will have cars there to take you to your destination or take-off for your transportation. They want to know the school, the coach, where you're staying, where you're going and the number of people you'll have to transport. If you'll get those filled out we'll turn them over to Don Weir at the office.

(Rider) Before I call on the next speaker, I'd like to call your attention to these projection machines here on the table. Dan Kinsey has provided them for us; this is an English projector, which, as I understand it, was perfected in England especially for the Air Force during the war. If any of you want any information about it, Dan will give you the low-down on it. Now our next speaker certainly needs no introduction to track coaches, all of whom are interested in pole vaulting. Cornelius Warmerdam, who holds the world's record in the pole vault, is here to talk to you about pole vaulting. And we have several shorts here, films of several pole vaulters in action, including himself. Is Cornelius handy here? Front and center. Cornelius Warmerdam.

(Warmerdam) I think it might be a good idea if we take about 30 seconds to stand up and rest those muscles we've been sitting on for a while and we won't get so tired. (There was a short rest period during which membership cards were collected.)

POLE VAULTING

Cornelius Warmerdam, Fresno State College, and Richard (Boo) Morcom,
University of Pennsylvania

(Warmerdam) Fellows, I've been on this NCTCA panel before, and when I was first approached on the idea of appearing again I wasn't too interested because since I had been on, I thought we'd just be repeating the things we'd said before and not gain too much from it. With this picture deal, however, I think it will be a lot better. What we're going to do is to show film strips and talk about them as we show them and run and rerun them if necessary. I think it will bring out all the fundamentals that we would cover in a talk anyway, and you will have plenty of time to ask any questions that might come up at any time during the discussion. It's not going to be a cut and dried speech; it's going to be more of a panel, or we might say, more of a bull session. I'll say at the outset that there are three of us concerned here: Dan Kinsey, who has already been mentioned by the chairman, has done a lot of work with us. We were together after two o'clock this morning and he deserves a big vote of thanks for producing these machines and giving his time to help us. Dan, will you stand up so everyone can see you? Dan is from Oberlin and has latched on to a great idea with these machines. Boo Morcom of the University of Pennsylvania is going to handle part of this. I've vaulted against Boo quite often and I want to say that if he had kept on he would have joined the circle of 15 foot vaulters. I don't know why he quit; he was right at the top when he did, not at the top of what he could do, rather he was just beginning to find out what he could do. Boo, will you stand up? Boo Morcom of Penn.

Now we're going to show first a picture of Fred Barnes, a vaulter at our college who was NCAA champ last year. I wanted to show him because he has both good points and bad points in his vault and I want to point them out to you. I want to show you the things that he did to get him into his bad habits and what we're trying to do to help him. I think he has one of the best plants in the business, one of the best shifts, and in general his approach as he comes into the box and takes up from the ground is one of the best that anybody is employing right now with the exception of Laz, who also is exceptionally smooth in that respect. However, in the later stages of his vaults Barnes does have serious faults which I'll point out; it may be that you are encountering the same faults in your beginning vaulters. I think that what we'll do now is run through it once and then go from there. (Pictures) This is a vault at 14 ft. 4 in. which he did not make but which shows everything that we're interested in. Now if you'll go back, Dan, about two strides away. As you can see, he keeps the pole in real close, he never lets it get away. Now remember, the pole is your friend and the closer you stay to the pole, the more efficiently you're going to vault. The minute your body gets away from the pole, the minute it gets out of line from a straight line from the beginning of the runway, from that moment you're in trouble. So the idea is that as you move it forward with that right hand, you keep it in close to the side of your body. Start it early enough so that there is a smooth, gradual movement rather than a snap or jerk into the box. Notice that his pole is planted first before his foot ever gets down; the pole is in the box now and his left foot is just hitting and that is an important point. The pole must be planted before that left foot hits the ground, or in other words, it's planted and you run under it. I might say now as this panel goes along, this isn't pre-arranged. Boo may differ with me on any aspect of vaulting but that's perfectly all right, that's the way we learn. Nobody has all the answers and I've never heard of anybody that did.

Now right here we've paid a lot of attention to the elbow to be sure that the elbows are not extended at this point. If they are extended, there's no way to ease the shock, you have no cushion, no shock-absorber, and consequently you have a rough take-off. You can't do anything about it; your body is more or less jerked off the ground. This way the body is under control and the arms can lengthen as you go into your swing. (Hold it there, Dan.)

You have seen the best part of Barnes' vaulting right now. He has a lot to learn and if he were as smooth on top as he is to this point, he would be vaulting 15 ft. today. Now right here and even a few frames before, we'd like to have the hips out farther if we can, with the heels dragging and the head dragging—in other words, we'd like to have that stomach more or less "belly" out, as it were, so that we hang in there for a moment before we start pulling. Now notice that he's not pulling at all yet, and he shouldn't pull. The momentum he has developed down the runway will bring his legs up as they are coming up now. See, he's not pulling even yet. Now, now he's starting his pull. So in general you can tell your vaulters to get the general idea of letting those knees get shoulder high before they start pulling, or in other words, they hang there and swing forward first. Now notice also that the turn hasn't even started yet. Barnes' big fault is that he doesn't have a good turn but a great number of vaulters start turning before they are ready; in other words, instead of swinging straight forward first and then pulling and turning at the same time, they start turning as they're swinging. Of course that means that they're going to be turned over too soon and many times they will be completely parallel with the bar instead of at right angles to it when they get up there. Now Barnes' big fault is that in high school he used to go over the bar on his back and that right leg which now should be crossing over to the left is coming back

this way and consequently he has an awful time turning the hips so that his stomach is over the bar. In this particular vault he gets it way too late. See now? Hold it, Dan. He should, of course, at this point be completely turned over, stomach to the bar, but he isn't and although the hip doesn't tick it off on this particular vault, it isn't an efficient vault because he's not in good clearing position there.

I'll give you just a little more dope on what he's using. Barnes has one of the highest hand-holds of anybody vaulting now, roughly from the end of the pole he's holding—not on all his vaults but on his highest vaults—he's holding right around 13' 11" or 14 feet which would be even with the bar—take 8 inches off—at 13-3 or 4. (Q) Is that measuring from the top of his hand? (A) That's measuring from the top of his top hand to the end of the pole. 13-11, take 8 inches off, that would be 13-3. That's the same hand-hold that I used, 13-11 at my top hand-hold. The reason he can hold so high is because he's got fairly good speed along with tremendous smoothness of plant as he comes in. As soon as he gets the rest of it on top, he should have it made; he's still in the learning process as far as that's concerned. Let it go through once more in normal action, will you, Dan? He has a very smooth run and has ample speed. He holds his pole about head-high which is a good carry. The only thing we've been working on is to put the bar way out and have him try to reach for it and just work on that turn. The other thing we're having him work on is to concentrate on thinking about that standard on the left and try to get that right toe pointed over toward it at this point. This has been very difficult for him. (Q) How far back is the bar? (A) At this instant the bar is back about 18 inches, between a foot and 18 inches. When he gets up to his top-level heights it is placed at about 8 inches to a foot. It stays pretty close to a foot and this will vary with different vaulters. You can't prescribe where that standard should be placed until you know what kind of a vaulter he is, whether he uses swing, how quickly he pulls, etc., etc. In general, to promote swing, that standard should be further away. Keep it away at low heights so that they have to swing for a while pulling up. After you have it away for a while and they pull up and come down on it 10 times in a row, they get the idea of hesitating in there so that they can get some swing. Now in this particular vault he's back, he's away from his hands just a little too far, in other words, his left foot is planted a little bit too far back. It should be forward underneath his hands a little bit better. We try to get it directly under the line of his hands extended over his head. Yes, the top hand, and if it's too far back the vault becomes too horizontal and if it's too close up under the hand, the tendency is to get the height too soon and come down on the bar. Has anybody any questions right now? Sometimes you're going to ask a question later and then you forget about it. We could answer questions now or else go on to the next vaulter. The next vaulter will be Bob Richards and Boo Morcom will handle the commentary on it in any way he sees fit.

(Question about the carry of the pole.) (A) We like to have the pole split, in other words, the distance between the hip and the hand here is the same as the distance from here to your hand over here while you're running. Like this (illustrating). We like it that way because we think it levels off the pole so that you are carrying it with less strain. It promotes a good right-hand hold. We feel that the shift and plant, once it starts, should be one continuous movement all the way through, in other words, once you start, you don't stop anywhere, you keep right on going right up until it's over your head where it belongs. Frankly, I never thought about that much except that we like to get it started early and we like to keep it going once it's started. We feel this is the best way to run with it although you see many vaulters with it way out here (illustrating) or with this hand way back and this one here; we feel that's very bad too although a lot of them get by with it and do a pretty good job.

(Q) Does the boy's height have anything to do with how high he can hold on the pole? (A) Of course it does; it has a direct connection. The taller the boy, the higher he can hold on the pole. We can demonstrate that for you here. Boo, will you come up here for a minute? Now Boo is 5-10 and I'm 6 ft. and I think I have a leverage on him of 2 or 3 inches which means that if we're both putting out the same amount of energy, I'm going to vault higher than he even though he's vaulting just as well as I am and maybe even better. Let's put our hands up like this. See, here's the way I take off and that's the way he takes off. You can see that I have quite a bit of advantage there. A boy 6-5 would be up here some place and that means that from the end of his top hand off the pole he's got just that much gain. I think I have about 4 or 5 inches over Boo and a boy 6-5 would have 4 or 5 inches over me, if he's efficient at all, so there's a direct ratio there. The other factors in holding high on the pole are how strong you are and how smoothly you're getting the pole into the box. Those three factors, height, speed and the smoothness of the plant, and of course your strength. All of these have a direct bearing and if you weaken one of them it's going to hurt your vault.

(Question about the take-off foot.) (Answer by Morcom.) As Dutch said, your take-off foot should be just about directly under your hands; it's pretty hard to say which hand or which side of the hand but your hands over your head should be directly over the foot, the take-off foot. Sometimes, if it's a really well balanced vault, a few inches behind the hands might be an aid but any time you get ahead of your hands you'll get jerked up there. A lot of boys like to get jerked up but it's pretty hard to control it. You get your height but you get it in front of the bar and you can't control it. But let's go on to the next picture; we've got several to show and we don't want to run over.

This is Bob Richards in training over in Helsinki. You'll notice that his run is relatively smooth, there's not too much jiggle in that pole and you can see from the expression on his face that he is thoroughly relaxed. We'll slow this down a little bit when we get down near the take-off to analyze it a little better. He's running with a pretty high knee and he's holding his right hand in back of him. (Q) How high is this vault, do you know? (A) I imagine it's about 13-6. Richards has a high knee-action and a good stride, his face, neck and shoulders are relaxed, he's got his pole out in front of him going into the slot now. Now he lifts up with his right knee and you'll notice that his arms are along the pole there in a bent position which will take up the shock. The pole seems to be directly over his head and he's pretty well under his hands. Now that right knee is lifting up here to aid him in getting off the ground. In the next few instants you'll see where he has it over Barnes in that he will hang as low as possible down that pole. Now watch; he stretches his legs out and lets them hang. This helps to lower his center of gravity and it takes advantage of centrifugal force in the swing. Now he's swinging up and he's not bending his knees too much; he's pulling them in a little bit as he goes up but he's letting them hang out as long as possible so that as he does bring them up—right now—you'll notice that he still hasn't used his arms. His right arm is still straight, he's letting those hips swing up shoulder high. He's got a good position now where he'll give it a little assist from his arms. You'll notice that he throws those feet back and gets his knees back very close to the pole. He still hasn't really begun his turn, he's still trying—now look at that. See how close his knees are to the pole? He's getting a very good upside-down position and he's begun with that right foot to cross over; he's tucking the left one underneath here so that he's in a position that he can make his turn. The pole, you notice, is right across the middle of his chest now and he's got his hips very close to the pole so that when he begins his pull, he's going to be pulling up at a very steep angle rather than towards the vaulting pit. He gets a little bit away from his pole now but his hips are still in pretty good position. Now he's taking his pole right in with him and his pole in this particular vault is going to get up pretty straight. He's got it right there by his shoulder and he continues his push. He timed that with the completion of his pull so that he's got a lot of momentum that he continues on. Now this is a relatively easy vault for him and he's really not going to finish that vault too well. He's already taken one hand off, now the other hand; he's still just half way over that bar. There's only one way he can get over it now and that's to straighten up. He's got his left leg down behind the bar to give him a leverage factor and now he will straighten his back up using that leg and he pulls his hands up pretty slowly in this particular vault. In a good vault he'd pull them up a lot faster but he goes into a reverse arch there to pull his body over. If you have any questions as we go along, I wish you'd just speak up.

(Q) Will you comment, Boo, on the spread of the hands on the pole? (A) That's a pretty good one. He slides his hands up. Now you'll notice right there, we estimate there's about seven inches between the two hands. Now a few inches is pretty good because it gives you the ability to balance yourself a little better, you have a little better control, but seven inches is somewhat of a waste there, I would say. -- You'll notice that Richards lands relatively close to the bar. He pivots over the bar and that's because he's got such a steep angle as he rises. He doesn't vault on a rainbow; he vaults on a "V", an inverted "V". If there are no further questions we'll pass on. We have three or four more vaulters to show.

(Q) The question has been asked whether or not Richards intentionally throws his head back. Actually, some boys really use this device. I wouldn't coach it; it takes the eyes off the bar and it's just another thing to think of, but a motion like that does keep a boy from pulling too soon and allows him to get a better pivot around the pole. Nb, I've never seen any real top-flight vaulters make a study of throwing their head back.

(Warmerdam) As far as the spread of the hands is concerned, in coaching I think it's tough enough to get them close together. In coaching you should try to get your man to put it right up there next to it. If he tries to do that he'll probably get it up there to within a couple of inches. If you try to tell him that two or three inches are OK, he'll go what he thinks to be two or three inches and it will probably turn out to be about a foot, so you ought to tell him to try to get them right close together.

This next picture is of Bill Sefton, a great vaulter from USC several years ago. He was 6-3, a great gymnast, and one of the most powerful men that has ever vaulted, as far as I know. He uses a different style completely from what we used and I think that if he had used what we were employing, the results would have been fantastic. He had everything he needed, speed, strength and heart and gymnastic ability. Dan, will you run this vault through once at normal speed? Now this wasn't a very high vault, I imagine around 13 ft. or 13-6. But notice the tremendous push-up that he had! Bill Sefton had a handhold of only about 12 feet on the pole and of course with his height he should have been able to hold much higher but he didn't. One of the reasons for that was in his plant. Now Don, would you take it up to his plant and stop it as he comes in? When Bill plants, you'll notice that his elbows are bent there the way they should be but in his case they never straighten out. He doesn't use any swing at all, he just powers straight up. See those elbows? They will stay right there in that position. He'll never let them get away. In other words, he's doing everything without swing; tremendous power. If he had employed a swing there, as I said, I think the results would have been terrific. It scares me to think about it. He never gets out of

that position, always has his body well under control. I don't think that's the way to vault coming off the ground; I don't think that's the way to coach vaulting but he achieved 2' 11" over the top of his top hand, which is very close to the highest anybody has ever done. 14 ft. 11 inches was his top height with a 12 ft. hand grip, that's 12-8 from the end of the pole, 12 ft. in the box. Now you can't get much better position than that from the end of the pole. I don't see how you can. That's beautiful and notice that that left leg (or is it the right leg?), the one that's folded back comes back and helps keep his body upright a little bit. It's very good. He was the leading gymnast on the USC team. Now notice that even without swing, he's so powerful that his body seems to keep on going after he releases the pole, something which you normally would get from a good swing down below but he gets it without the swing. He quit at the time when he was just exploring his possibilities; when he was a senior at USC was his last year. I think we'll go on to the next film because we are getting a little pressed for time and we do want you to see all these films. Now we'll both be around so if you don't get a chance to ask your questions during this panel, just remember them and check with either of us after this meeting.

(Morcom) This next vaulter, Martin Korik from Tennessee, vaulted over 14 feet and we've included him here because, despite the fact that he was a very fine vaulter, he has a ridiculous fault here that I know a lot of you coaches will recognize because you've probably seen something like this in your own back yard. I know that I have, but this boy really accentuates it, this fault of getting away from the pole. When we get a look at it, you'll see that this fellow must have had a lot of good things because anybody that can clear over 14 ft. and get away from his pole the way he does—incidentally, this boy's coach is here today and he has had some very fine vaulters. Now he's under his pole very nicely—this is at the Penn Relays—he's hanging down nicely, nice swing, letting everything come forward, the legs are swinging up now, looks like he's getting himself in a good position, he's still hanging down as his hips rise up. Very good; you see, he did have some good things here. You have to in order to vault 14 feet. This is 13-8. Now there he goes away from his pole and that's the last he's going to see of it. How he's ever going to clear that, he always has, but whether he will today or not—there goes the pole way over into left field or behind him. I don't know what he's hanging on to but it's not doing him any good. The rest of the vault is good; his hip elevation is good despite the fact that the pole isn't doing him much good. And now comes the full twist. His center of gravity has made a wonderful course there, right up over the bar and his height was right over the bar. And there comes the whirling dervish. Now just where in the vault there he lost that, it would be pretty hard to say. You could trace it back there some place, on the runway or the take-off.

(Q) How do you keep them from going out around the pole like that? (A) You see, he should pull right straight up the pole but he got away from it. I don't know how he did it but there it is. We've all seen vaults like that before but this is one of the greatest.

(Warmerdam) The next film will be one of myself. I've never seen it before so I won't be able to comment too much on it. I have three films of myself, this one, then we'll show another one at about 14-4, and the third one will be a vault of 15' 6 $\frac{1}{2}$ " which at that time was the record but which in my opinion does not show too good form. (Q) Anything wrong with this one, Dutch? (A) Well, not much. (Q) How high is that? (A) I don't know. I've never seen it before. Rider thinks it was about 15-3 or 4. (Rider) If you want to know where I got this, it was out of a Castle film short quite a few years ago. (Warmerdam) In this case the hands are quite close together, something which I always tried to do although in many cases I couldn't get them up.

(Morcom) Now we'll notice those hips as they ride forward and the fact that Dutch will let those feet drag down, keeping the center of gravity as low as possible. His hips don't go forward as he perfected it later on. He's taking advantage of centrifugal force now, letting the legs swing up. Now he's going to bring those knees in right into his chest and this is one of the best I've ever seen. He has a good basket position; he still hasn't pulled. If he can get his hips up a couple of inches more before he pulls—and he does. He really gets his knees back to that pole. This is mechanically perfect right now. Now he's just got the beginnings of his turn, tucking the left foot underneath and he still hasn't pulled. Now he's really getting a pull and a turn combined. That's right; he's got that pull right in close to his chest, staying right with the pole, pulling up. Wonderful angle there, wonderful. Those legs are shooting right up to the old sky. In this particular vault, I think he could have possibly held higher or if the bar had been a little farther in the pit he would have got a more maximum vault; you can see his hips are way over the bar. That's a 16 foot vault if that's 15 ft. on the bar. His chest is now coming very close to the bar but his hips are way above it. I think he does touch the bar but he certainly gets a lot of clearance over it. You see, if the bar were a few inches back, he'd have time to open that chest up and add a lot of inches on to the vault. But it's a beautiful vault. Mechanically, that's the best vault you'll see today. There's that thunderous stride, a beautiful, smooth take-off, swing, the basket position, the turn, and he's still going up. He's over the bar and he's still going up.

(Warmerdam) We still have time for just one more picture. This next one will be a vault of 15' 6 $\frac{1}{2}$ " made in Berkeley, California on a day when I didn't think that I was vaulting at all and I don't think it's a

true indication of real good form. However, the height is interesting. The main thing wrong with this vault is that I got away from the pole too far. You'll see that as I get up into position to push, I never do get the pole straight up but I must have got a good catapult action from the swing which is what the swing is, what it's supposed to do if you're going to use a good one. It's supposed to catapult you up there so that when you get ready to pull, your body is already moving rapidly upward and any pull that you can add will just accelerate that and then keep it going until you get ready to push and the push keeps it on going from there so that it's one continuous movement. See the knees here; they don't come back to the pole as well as they did in the other film. They never come back as well even though you can't see it from that angle. Now see here I'm getting too far away from the pole, yet I've got enough momentum to bring it back in and stay in good position. We're going to run through this once more and then we'll be done. I don't think we're going to have too much time for questions, are we, George?

(The film is run once more, then lights and applause.) (Warmerdam) Thanks a lot, fellows, on behalf of Boo and Dan and myself. I wish we had more time. We spent three or four hours going over the films and it seemed as if we picked up something new each time. I know we didn't devote enough time to fundamentals, starting, etc., and there may be questions you want to ask, so we'll stick around and be here later in the afternoon. If you have any questions we'll be glad to answer them. Thank you very much. (Applause)

(Rider) I'm sure you men feel as I do, that it was worth coming here just to listen to this one little part of the program. Let me suggest that if you want a tape recording of all the details, pay your membership dues and get them from our new secretary. I want to thank these men for their wonderful job. Now we're going to take about five minutes for a break and to allow Tug Wilson, our Olympic president, to tell us a little about the plans for the next Olympics, something which will interest you men probably more than anyone else. Mr. Wilson.

(Kenneth "Tug" Wilson) Gentlemen, I hesitate to break in on such an instructive session as you are having but this will be the only opportunity I'll have to talk to you. With the Pan-American Games in '55 and the games in Melbourne in '56 we face some of the damnedest problems that we have ever faced in Olympic competition. In '55, in the Pan-American games, previously the State Department had asked us not to go down and overwhelm our neighbors to the south, and we sent somewhat of a skeleton team. Well, that kicked back in just the opposite way. When we didn't win 1-2-3- in many of the events they seemed to think that we were slipping. Consequently when we send a team to Mexico City, we're sending practically a full team or the number that it requires to do the job. Many of you have asked me just what are the dates. We can't find out. Due to a change in the administration in Mexico, they fired their whole organizing committee so they've got new people in charge. All that we know is that the dates will be some time in the third or fourth week in March. We'll get the information to you just as fast as we can and I know that Jim Kelly and his committee will relay it down to each and every coach. But we want to do a job down there. Tentative plans call, if possible, for a session down in Texas on our way if we can arrange it, with the different Texas schools and the AAU throwing a big meet there on the way. In this way we hope to raise some money and also condition the men for outside competition as many of the good competitors will have come from indoor work.

In Melbourne, as you know, the games will start November 22. It will be a session that we will have to fly to. The best advice that we can get on weather conditions is that it is terrifically hot and that there are a lot of winds down there. We'll probably have to get down there at least ten days to two weeks early to get acclimated to conditions. That, of course, presents this problem, that a kid who goes from college—and about 85 to 90 percent of our Olympic competitors at Helsinki were college kids—will probably have to leave around November 1. That means that a boy will probably have to miss a semester or a quarter of school. Many of you are worrying about the military courses the kids are in. I have been in contact with the Defense Department and the Secretary of State. They are so anxious that we make a good showing and continue winning, that they'll make all kinds of concessions. This, of course, isn't for newspaper consumption but you'll have no trouble with boys in ROTC, Navy Air Corps and whatnot. The service commands are doing a great job for us.

The trials will present quite a problem, whether to have the trials in June and hope to God that the kids will keep in shape until November. There's that problem, or whether to select double the number that we're going to send and then have some trials just before departure, in California. That may be another solution. But bear this in mind. We may get licked in gymnastics and Graeco-Roman wrestling and some of the things we haven't done very well in, but remember this. The Olympic foundation is Track and Field athletics. We never can let that supremacy go and listening here and seeing the intense interest and knowing the results of high school performances and the rapid progress you men are making, I don't think there's any doubt that we'll do all right. But the main thing is that we want to do a good job at the Pan-American games and I hope that your universities will be friendly. It will take some talking, probably, with the presidents and the faculty to get the men off. The men who have to get back to classes, we'll get them back as fast as we can. We will not be able to shuttle them back and forth to Melbourne; it's just too far and we want the team to go as a unit and come back together. So that will present a

tremendous problem. Our competition is going to be rough from Russia. There's no question that Russia and the Iron Curtain countries learned a great deal from the Olympic Games in Helsinki. They're going to make great progress and we've got to pull together and do a great job ourselves. I just want to take this opportunity as a person who has seen all but one of the NCAA championships right from the start, to congratulate you on the way you've stuck at your job and for the progress you've made, in spite of limited budgets at times and in spite of the way you people get caught every time we have a depression. If we have the same fine working units in every sport, I don't think there will be any question as to how we will fare in the next Olympic Games. Thank you very much. (Applause)

(Rider) Thank you, Tug, for that information. I know we are all very happy to get it. - - - - Is Chic Werner in the audience? Come on up, Chic.

PANEL ON DISTANCE RUNNING

George Rider, Miami University; Chic Werner, Penn State University;
Bill Easton, University of Kansas

(Rider) We can consider ourselves indeed fortunate to have two of the foremost distance coaches in this country to appear on the program. Bill Easton here, who has been our secretary for a long time, as you all know, has turned out some great runners and his current product, Wes Santee, is a byword nowadays. Chic Werner of Penn State, who, as you also know, was one of the assistant coaches in the Olympics at Helsinki, has turned out some wonderful track men. For the first time in the history of the Olympics, an American, his boy, won the steeplechase. Horace Ashenfelter and Bill Ashenfelter and Curtis Stone are among the many which Chic has produced and he also had them under his wing in the Olympics. Now on the program I'm supposed to take a little part in this but I'm going to pass most of it on to these two men. Let me say at the beginning, and I think that we can all agree, that training for middle-distance running differs considerably throughout the United States and the world in various details. Here's Roger Bannister of England who was the first man to hit that four-minute mile, certainly not the last one to hit it, in my opinion, who trains in what we commonly call the "English Way." Now there are many different ways of training and the English thesis seems to be that no coach can teach a man as much about himself as he can gain from his own experience. It seems that Bannister is one who has trained himself primarily and he has disciplined himself tremendously and if you will permit me, at the expense of perhaps all of you probably having read the article that came from London following that great race of his, I'd like to point out and to read to you just a few excerpts from it.

The article is entitled "Bannister's Faith and Hard Work Made Mark Possible." I think that all of us who have done some coaching with distance runners will agree that it takes faith and hard work and plenty of it. Now this is a London report of May 29th; it is a scientific story of how Roger Bannister ran his world record of 3:59.4. I can't verify the fellow who wrote this or all of the scientific details but the things that he has mentioned, I for one think are mostly good. That's why I'll present this and then we'll ask the experts here what they think of it. It's the story of how he slowed his heart, how he changed it in its very structure, how he built up the giant supply of oxygen and finally how he ran on nerve alone to the point of complete and absolute collapse, from what we saw of the pictures. He passed out at the end of the race. Now if all of us could extend ourselves that much, I'm sure we could all do considerably more than any of us now do, or ever did in the past, for that matter. "Now this medical student turned himself into a human machine, a veritable guinea pig in his inexorable drive to achieve the four-minute mile. Blessed with a barrel chest, with a large rib-cage for his powerful lungs, the 25-year old Bannister began boosting his chest measurements even more. He altered the very structure of his heart, his blood vessels and his muscles by severe training methods. And all the time he was keeping close scientific observation of himself in the coldly detached way of the medico. His basic problem, according to this, was somewhat simple—oxygen. He had to get even more oxygen from the lungs to the muscles, to the legs where broken down food is stored. Then he had to burn that food to provide the necessary energy for his efforts. Bannister was fortunate to have not only a superlative heart to start with, but a fighting one as well. He succeeded in getting his blood to pick up oxygen from the lungs more quickly than most athletes and meanwhile he learned to co-ordinate his body-muscles to take him the distance with the least wasted effort. (Now let me jump down here.)

He worked out steadily whenever he could get away from his medical duties at St. Mary's hospital. He worked in all manner of weather and did it almost always alone. (That's significant from my point of view and certainly one of the methods of training.) Bannister, too, was quietly confident. He knew that the four-minute mile was possible. He had told the learned British Association's physiology section last September: 'In theory there is no limit to any physical performance but various physiological factors cause the margin by which records are broken to diminish steadily. In sprinting and javelin throwing, speed of movement is limited by muscle viscosity, an innate property which can be influenced little if at all by training. In weight lifting, speed of action is at the option of the athlete. Sheer force of mass of

muscle is what counts and suitable training can develop it. - - -

(There is a break here as the end of a reel was reached. Bannister goes on to speak of the possibility of improved performance by improving the intake and utilization of oxygen.)

- - - while breathing various controlled mixtures of oxygen and air. With 66% of oxygen, they appear to be able to go on indefinitely where breathing plain air brought exhaustion after eight minutes. This is the problem the mountain climbers surmounted when they went up the peak of Mt. Everest, with oxygen tanks. But such artificial assistance would take running out of the field of sports. Thus, the solution lies in getting more oxygen into the system without resort to artificial aid. The heart is a muscle and Bannister aimed to make it more muscular. He strove to increase the full-stroke output of blood and oxygen. By punishing the body he toughened it and thereby increased its recovery rate. Bannister once had a normal pulse but by steady running he slowed it down. Two years ago it was about 50, then with his concentrated efforts of the past seasons and especially of the last half year, he boosted the per-stroke output to the point of a pulse of between 40 and 50 at rest. The average man, as you know, has about 72. This slow pulse beat meant that Bannister could feed his body with much more oxygen when his pulse increased under the hard work of running. With each heart beat there pumped a more than normal supply. Bannister's medical knowledge, of course, helped him in this. Now here's a significant point that I would like to emphasize and I think that most of us might agree with it. Bannister took the almost unprecedented step of enjoying a six-day layoff before he ran his four-minute mile. He had no fear of the muscular effect of such an unusual move. After his June 1953 paced mile of 4:02 there remained little doubt that Bannister could shave off those stubborn two extra seconds; in the minds of some the four-minute mile was a certainty for the tall lad as far back as the summer of '52. Then in a secret trial with Chris Chataway, he had sped an unbelievable 2:52.9 three-quarters. He lacked, however, the full strength for the fourth lap two years ago. Bannister got down to hard work to build the extra strength last winter. He engaged in what is known as "interval running." One day he would do 15 dashes of 150 yards each, jogging between spurts. Other days he would vary ten quarter miles, three half miles or two three-quarters.

Then on April 12th last, he began the home-stretch training drive. He began with seven half-miles with three minutes of rest between each half. (Try that some time.) Two days later he soloed a three-quarters in 3:02. He stuck then to his theory of even laps as far as possible, 61, 61, 60 seconds each. On April 15th he sped a half mile solo in 1:53. From April 16 to 19 he went mountain climbing in Scotland. On April 22 he cruised through ten quarter miles at an average of 58.9 seconds. On April 28 in a high wind he ran a solo three-quarters in the outstanding time of 2:59.9. Two days later he was caught in 1:54 for the half. From May 1 to May 6 he did nothing, merely storing up energy and on May 6th at Oxford he ran his classic mile in the classic tradition, a fast first 440 which was 57.5, the half was 1:58.2, the three-quarters in 3:00.5. He came home in 3:59.4 for the first time in history. It is interesting to note that when the great moment came, Bannister was human. He achieved his goal without the level running he deemed best. A fast first quarter, two slower inside quarters and then a fast last lap, on his nerve and the stored-up oxygen. 57.5, 60.7, 62.3, and 58.9. (Now possibly he didn't run as even as he had figured but that's not very far off, is it?) Just a little bit more. The story of the May 6th mile is now very well known. When Bannister finished the race his pulse was 155. (The scientific end of this, I think, should be interesting to us and that's the only reason I'm reading this as it was put out.) His pulse did not become normal until three hours later. He momentarily was color-blind; he was in a temporary state of complete collapse, yet so powerful was the Bannister physique that in less than three minutes he was jogging easily on the infield with his two friends, Chataway and Brasher, who helped him in the race. In conclusion he says this: "I hope we can forget about time and just concentrate on races. I think the four-minute mile has been over-rated. After all, it's only time and the essence of athletics is racing against opponents rather than against the clock."

It seemed to me that there were a number of factors there that might stimulate him to answer some questions. We know the Swedes with their speed-play, their fartlek program; the English, as I suggested, and we've got a few Czechs who do a pretty fair job of running, and there is our own American style. So I'm going at this time to ask our experts here, Bill Easton and Chic Werner, to bring out as far as they can what they consider the fundamentals to be that all great distance runners seem to have, at least in some degree and perhaps suggest how their own champions differ in the use of these fundamentals; and just what emphasis, perhaps, they personally feel should be placed upon them. So with that, suppose we lead off with you, Chic.

(Werner) That was a pretty comprehensive question, George, just what these fellows all seem to possess and what they would like to attain, how they go about it, etc. I think the big thing in distance running progress has been the evolution of our methods of conditioning. I don't think it's been too many years back that we can recall being underdogs not only in distance running with the rest of the world, but in the javelin throw and several other events. It seems to me that the American coaches, when they find themselves underdogs, not only try to read about what the better ones are doing, they get over there and observe them and question them; in fact, some of them get these fellows to come over and go to college

here, in their schools. (Laughter) By one means or another they seem to learn an awful lot about these things. It's proved to be worth while inasmuch as we don't stay the underdog too long. Our javelin throwing has reached very respectable performances and the same thing is going to happen in our distance running. I couldn't help but feel a little bit odd about all the things that Bannister did after he ran the better-than-four-minute-mile which was one of the very greatest achievements. I think we're all interested in everything that he did but they got that down pretty fine. Now I wonder if Santee should run 3:56, what we would read that he's been doing that probably at this moment he doesn't know about. Surely some guy is going to have to write some very outstanding stuff to credit the boy with. I think a lot of us know about the slow heart that comes with distance running. We knew about anoxemia from our aviation in the last world war, and so on. Now it seems to me, as I said before, that the great stride in our distance running has come with the evolution of workouts in conditioning. You'll recall if you have copies of the old track books by Tom Jones and Harry Gill, that they almost had the same things way back twenty-five or thirty years ago that we have now—with one exception. The weekly schedule of workouts was monotonous; Monday you did over-distance, Tuesday you did under-distance, Wednesday you did even distance and so on and they had very logical reasons for doing this. The first fellow in this country who started what I would call "over-working" his boys was Billy Hayes and he picked it up from the Scandinavians and I remember Harry Gill telling me, "This is a very temporary thing, don't be swayed by it. (I was Harry's assistant at the time.) They seem to be licking us and breaking records but they are just young fellows and I wonder how long they'll live." Well, they're still going very strong, the foreigners are still doing the same thing and I notice that all of us are now adopting the same program which to most of us in the old days seemed to be over-working the boys, killing them off. One thing we must keep in mind in this country, and that is that our boys are students. They do this athletics at the same time they go to school. The Zatopek program—I just don't believe that an American student could do it and still go to school. I think that at the end of about one third of a Zatopek program of conditioning, our boy would like to lie down and sleep for a week, to forget all about classes, to forget all about studying and everything else. Yet this fellow goes on doing the same thing, day after day, and he is as strong as a horse. They say that Landy is of the same type. Dave Rankin's boy, Johansson, has just been over in Australia and he has written to Dave about the workouts that Landy takes. Dave, I'd like to impose on you for a minute to tell us what you were telling me about the other night so that we would know how hard these fellows work.

(Rankin) I first received a letter last year when he was in Australia and Landy at that time was doing a work program in the evening, I think at that time it was around ten or twelve 600's. He'd jog until he felt recovered and then he'd start again, which is the punishment system we talked about. Several weeks ago I received another letter from Finland. At that time Johansson said that Landy had done his best work in Finland after being there about two and a half weeks; he did 12 times 57.5. Now Denis goes on the theory that the main thing to watch is the recovery period; it was 3 minutes and 30 seconds between 12 times 57.5 which is quite a workout in itself. It is significant that this is within about two seconds or so of the pace he intends to run to break the four-minute mile or break the present record.

(Werner) Thank you, Dave. Now I don't want to take too much of the time but when we're talking about this workhorse program, I certainly want the high school coaches to know that I don't believe there's a college coach in the room that feels that a young, growing, immature boy should be subjected to any of the things we're talking about. By and large the fellows that we are talking about are mature. They are at least of college age and a lot of them are beyond that. Last winter in Cincinnati we had on this same panel a high school coach from the New York area who had had a number of successful distance runners and teams. He knew what he was talking about and among other things, one of the things that amazed me was when he suggested that he very often had his boys run a four-minute mile within a period of ten minutes, broken up into any intervals they like, either four 60 second quarters, two 2 minute halves or eight 220's of 30 seconds or whatever it would be, and you take enough rest in between these various things so that the four minute mile, adding up the running time, would take only ten minutes. Well, I thought that was swell and I wondered why I didn't think of it myself. So I went home and I thought I'd take these more mature college fellows, perhaps a little stronger than the high school boys, and just to be on the safe side I'll make it 15 minutes. Well, out of a squad of about 35 boys from the quarter on up to the two mile, I think we had one fellow who did it in 15 minutes. We tried it again about a week later and we probably had four or five who could do it within a 15-minute period; most of them did it within 17 minutes. But every one of them did it in four minutes or better. We kept statistics on this, the kids liked it, they thought it was novel, they all agreed that it was a devil of a workout, very tough; they didn't want this to happen very often but they seemed to get a lot out of it. This 4-minute mile gadget seemed to hook on to something they liked. I began to wonder if this high school coach didn't overstep his figures a little bit. I don't see how a younger kid could do that. But that is the basis about which we're talking now when we say the difference in conditioning. I think that's the big thing. I've taken too much of our time so go on from here, Bill or George.

(Rider) There are some other vital things that I think we want to consider. Bill has some very good

ideas of his own about this run, run, run. I don't want to let this get by without some other things entering into it; I'll just throw them out and you can discuss them between you, desire on the part of the participant, self-confidence, the importance of speed work, sprinting when tired, pace work, knowing the opponents, their strength and their weaknesses, strategy, and so on. Bill, will you take over from here and tell us whatever you think.

(Easton) Thank you, George. Frankly, speaking of distance running, I think we have all read all of the material about Wilt and Zatopek workouts and so on, and I think one of the important things we have to remember, as Chic mentioned, is the age and maturity of the college level man. Too often you can start out and give them so much that they get sick and tired of it and pretty soon you won't have anybody out there working. So you have to start with them very gradually and sort of sneak up on them with this distance stuff and work them into the heavier program after they get accustomed to that type of workout. Really, I don't know just what to say that hasn't been said already concerning distance running. I think we've read many of the various articles that have come out recently, by Ken Doherty and other men who have followed up this fartlek type of thing. As Chic mentioned, Coach Billy Hayes was way ahead of his time and was given credit for being a slave driver in the field of distance running. You know all of those men, Hornbostel and Lash and Wilt and the whole gang, are still alive and still very much interested in distance running so evidently he didn't curb their appetite for hard work. Now the thing I'd like to bring out—then we'll leave it open for questions if we have any time—is the fact that the old Hayes theory was that over-distance should be followed by pace work and speed work and the thought that George threw out concerning the over-distance is very good. But you must remember that the boy must have a sense of pace and to cap it off, one of the most important things is that he must have a high rate of base speed and you can't run him over-distance all the time and expect him to go out and run good time unless he really has base speed to fall back on and can keep his relaxation. Now that is basically the old Hayes theory and it's still just as good as gold on any one's campus today. With that, I'd like to quit and leave the forum open for any questions that might be asked because I'm sure I'm going to do nothing but repeat what has been said many times before on distance running.

(Rider) Bill, I think some of these men would like to have your story on Santee's pace. If I remember correctly he ran 2:00.9 the other day in a 4:00.6 mile. If I got the story from the press right, he ran his first quarter in 58.1, his second in 60.6, his third in 60.3 and his last lap in 60.6 which is pretty even pace. That's 1:58.7, which was half a second off Bannister's time for the first half and 2:00.9 for his second half, which was .4 seconds off. That was pretty even for the two men. Perhaps you'd like to comment on that.

(Easton) I'll be glad to. I think Santee's case was a little different in that we didn't kill him on work. He did just the opposite type of thing to what I've been listening to here concerning Landy and the so-called tough workouts that he's been doing. Wes came back from Europe a very tired individual and during the fall he ran partly the type of work—pretty much on his own without practically any time trials at all. He came up to the National Collegiate Cross Country in excellent condition and a tremendous desire to do a good job which he did here on the course at Michigan State. We went from there to a rest period; we gave him about two weeks of practically nothing after the National Collegiate and then started him in on indoor work. Our work indoors is done under the stadium in a very cold situation; we don't have excellent facilities and our work has to be done a lot out of doors because we're so crowded. We continued working out of doors and thank heavens, the weather in Kansas last winter was open and very good and he continued the same type of workouts in fartlek with the speed work and pace work under the stadium. Our idea was to bring him along, as I remarked at the Cinci meeting, to bring him down from running 4:08's and 9's to 4:06's and 5's and then hope that we could drop down below that level. Now he's inherently and basically fast, having run 47.6 in the quarter and is able to change pace almost at will during a race. And as I remarked before, he is an exception and not the rule on these particular things. But to give you the picture further, coming outdoors we proceeded to go into more quarters but he was pretty much on his own with no great pressure on him to go out and run at any time against the watch. I don't suppose that during the spring season we had timed more than half a dozen quarters for Wes and this group of senior boys that we have. Now I learned something from that because as you all know in coaching, the boys teach you more than you teach the boys in the major number of cases. In his particular case, he was so far advanced and our senior boys so close behind him, it was a very simple matter to discuss workouts with them and decide what they should do and then let them go out and work out on their own without any pressure or watch on them in any way, shape or manner. I believe that this can be done today in almost any situation where you have a group of boys with leadership and the desire to be better. I don't think it's unique in our university. I think that any group of boys will do that particular thing. Secondly, I have a hunch that they'll do a lot better work individually, for themselves, than if you're there holding a watch on them. They get a lot more enjoyment out of it and they feel that they're doing something for themselves and not being sort of pushed into it as they so frequently feel when a workout schedule is set up for them hard and fast and that's what they have to do. Our workout schedule was usually

over-distance in our preliminary warmup and then go into probably a hard quarter on Mondays with work on the grass for speed work. Tuesdays they'd do a warmup schedule and then come in and do four or five continuous quarters at a variety of speeds with jogging in between and lots of boys with walking, jogging and walking in between and then on Wednesdays they'd do 220's, four or five of them depending on what the boy was in and how he felt, four or five 220's. Always on a continuous basis and I think that our recent innovations of interval running has done more, what we call ups and downs, that's speed and jog, has done more to help us than anything else. As they get into condition they like to do that because it's a very natural thing for a boy to do and one of the things they get a kick out of doing especially if they work in threes or fours together with the leadership of one or the other in each of the quarters or 220's; they get a huge bang out of it. I believe that that is the greatest change that's taken place in our workouts. On Thursdays we do the open straightaways, or open quarters as you call them with a jog on the curves, or we move over on the grass. Our track is very hard and the major portion of our speed work is done on the grass and they like that. And then after all of our workouts we do a heavy calisthenic schedule, pulleys, with the medicine ball, all of our push-ups, and so on. Now that's just backwards from what a lot of you do but we feel that it does the kids more good after they get tired than to have them do it before they go out and tire them before they go out on the track. Now that's pretty much our schedule and I don't think it's anything unusual. I have an idea that most of you men out there do practically the same thing with perhaps a change here and there to take care of a particular boy. This isn't hard and fast and it's a thing that is done with variations as to individuals who are out there doing that work. We think more or less that the idea we have of leadership and desire plus the fact that they are willing to put out on each of their workouts, as it has been brought out here, has been the secret of the success that we have enjoyed at Kansas. I believe that that can be true at any place where you get a group of boys who have both leadership and desire in their group. I'll be glad to answer any question that you have specifically on any one thing that I talked about.

(Rider) Just one other thing I'm going to throw at Chic here that I'd like to have his opinion on and that's in relation to mental and emotional fatigue. Can you do that briefly, Chic?

(Werner) I'm glad you asked me not to take too much time because I know we're getting hungry. There are a couple of types of fatigue, in the minds of many who coach distance runners. One of these is physical fatigue, the other is mental fatigue. I'll make an attempt here to differentiate between the two so that you can tell one from the other. I would say that physical fatigue is very, very rare even in a poorly conditioned boy. There is something within the body that shuts it off when it starts going beyond certain levels. You are protected by nature from physical fatigue in 99 out of 100 cases. Fatigue, which is the big thing we're trying to overcome in distance running, is very largely mental or emotional. Let me illustrate. We've all seen boys in a race finish a mile run, for example, a high school kid, pooped to the gills. He can just barely navigate. He just puts one foot up after another; it's hard work and you can see it. Then the announcer will announce the time which is better than he ever did before, and the kid gets spring in his legs, starts jumping up and down and running around the track, very full of life. The same thing is true in something else we've often witnessed, the boy who's lagging in a race, maybe in second or third place. He's shot, it's very apparent that no one can expect much more out of him, he just can barely get there and he happens to look up and the guy in front of him is even worse than he is. So, he gets a stimulus, he starts sprinting, he licks the fellow in front of him and boy! does he feel swell! Now all this happens in a matter of a few seconds. You can't tell me that this was physical fatigue; that's emotional or mental fatigue. The Indiana boys, I know, were coached by Billy Hayes to get out of the monotony of plop, plop, plop distance running and to get some variety into it. I can recall in big meets like the Penn Relays seeing Lash and perhaps Tommy Deckard and others, when they were going along at a very even pace, in close to a record performance race, just in the middle of it they would take off as though the tape were just 30 yards from there and just sprint like the devil for 30 yards and then settle back into their pace. I recall asking Billy Hayes, "What in the world's going on out there? Are these kids crazy?" He said, "No, they are breaking up the monotony of a steady pace and they are removing the possibility of mental fatigue by variety." He said, "I don't care what you do, you can scratch your head, you can slow down, you can speed up, you can run over to the side of the track, you can do anything, change your arm action, change your leg action, look around or up to the sky, just do anything different, to break up that monotony and relieve yourself of the possibility of mental fatigue." I could go into that at greater length but I think that will be enough to get us out to lunch.

(Rider) Thanks, Chic. We'll give you just three minutes to ask a question or two of these men, if you wish. We have one more speaker on this program. Perhaps you will save your questions to ask them in person. Now, as Ken Doherty said to me in the letter I read to you at the beginning, "We can no longer depend entirely on common sense and trial and error methods of coaching if we are to meet the challenge of other countries in the coming Olympics. It would seem that we're going to have to call on our scientists to help us solve some of our training problems and perhaps change our coaching methods." So today, it will be perhaps the second time that we've had a scientist on our clinic program of this sort. We have a

man who, I'm sure, can shed considerable light on at least some of our problems in the related field of psychology. We're happy at this time to have with us Dr. Elton B. McNeil of the University of Michigan Department of Psychology to talk to us on "Psychology in Coaching." Dr. McNeil.

PSYCHOLOGY AND THE TRACK COACH

Elton B. McNeil, Ph.D.

A few weeks ago I received a letter asking me to address this gathering of the National College Track Coaches Association. At that time I was informed that this would be the first occasion on which a psychologist was asked to speak to you as a group and I must admit I was a little surprised. At first I thought that this invitation might have been sponsored by some of the more aggressive and die-hard members of alumni groups around the country. I knew that whenever I attended a track meet and our team would lose, the alumni all around me would begin to mutter that the coach ought to have his head examined—and I thought perhaps this was the basis for my invitation.

In a more serious vein, I know that there is considerable concern, at the present time, with the ways and means of entering a new phase in the evolution of coaching methods. Ken Doherty of Pennsylvania is particularly interested in encouraging a movement away from the simple "trial-and-error" age of coaching in order to promote an era in which it will be possible to make a deliberate application of scientific methods and principles in gaining the very best performance from each individual who goes out for track.

The age of "trial-and-error" in coaching exists in part as a result of the nature of the system itself. Over the years the learning of coaching techniques and methods have been accomplished under an apprenticeship system. You learn to coach and teach others by drawing from your own experiences as a track man, by combining this with the observations you make of the experiences of others who are out for track, and finally you add the sage advice of the coach under whom you trained. This passing of experience and "know-how" from person-to-person under an apprenticeship system carries with it certain important disadvantages which are characteristic of any such system. At the present time each coach is in a sense required to act as his own textbook in teaching the skills of track. In the event he wishes to learn of ways to improve his methods and techniques he must seek out more experienced coaches who will share their "know-how" with him.

At this point a difficulty arises in that some of the best operating coaches may be the worst teachers of other coaches. A long record of successful coaching of track does not necessarily qualify a man to be a teacher of other coaches. A man may be exceptionally capable of doing the right thing at just the right time and equally incapable of communicating to another person the general or specific principle that guided his decision.

In addition, it can be observed that a great coach may possess an unusual capacity for producing sensational teams and yet be in error in his diagnosis of what exactly it is that makes him so effective. It is on this basis that many superstitions and myths arise about special methods and techniques in coaching. I am sure each of you has some pet theory that at one time or another you have felt to be helpful. It may be the proper hour of retirement for the men, their diet, their social life, or their behavior during work-outs. It is a reasonable deduction that since each of these special methods seems to work for some coach at some time, it is more probably true that they are much less important than the personality, enthusiasm and sense of assurance that the coach emanates when he insists on obedience to the rule.

These basic difficulties inherent in an apprenticeship system are ones that each of you, in your own apprenticeship, must have noticed. There is good reason to believe that the problems of the apprenticeship system become the most apparent when the junior coaches gather late in the evening for a bull session, and the head coach isn't there.

These problems suggest that as yet there is no adequate body of facts or principles that is sufficiently uniform to give assurance of a standard method or technique that can be taught by most coaches around the country. To the degree that you have yet to attain such a solid core of scientifically based and widely accepted coaching "know-how," then coaching is bound to remain a matter of considerable personal pioneering and individual variation.

Let us suppose we could agree there are potential advantages in making coaching less individualistic, and in greater part based on a scientifically derived series of principles. We must then ask what sorts of problems might logically be tackled by psychologists, and in so doing, we ought to seek problems where coaches are not in complete agreement about the best methods. I am sure you could add ten problems for each one I might mention, but I would like to point to a few possibilities. Let's look at problems of training and teaching first. One chronic problem concerns the most effective technique in teaching any of the complex skills that make up a track performance. Pole vaulting, for example, is made up of a composite of specific skills, which must fit together and be integrated to total one smooth, continuous performance. How do you teach such an integration? Is the student best taught each specific skill to perfection and then attempts made to combine them? Or is peak performance a result of learning an integrated, whole

action, the details of which are smoothed out as training progresses?

There are other problems that you face. Should you have a man practice when the urge strikes him and his motivation is at a maximum or should practice sessions be regular, planned and systematic? This raises the additional problem of knowing when an individual has practiced too long. When is the point reached where continued practice begins to have a detrimental effect? Is this point of diminishing returns the same for the learning of all motor skills, or does it exist differentially for the high jump, pole vaulting and the 100 yard dash? How much should a man practice alone, and how much with others? Finally, there is the basic problem of determining the quickest and most effective way of having a person unlearn those responses which are wrong so that he is free to learn the correct response.

In contrast to these problems of teaching and training you may face greater difficulties in the area of performance. Perhaps there is nothing quite so provoking as to carefully nurture a runner to a peak of physical and psychological readiness when you know that at the crack of the starting gun you are never sure exactly how he will perform. The elimination of unpredictability of performance in the team must at times seem to be more important than the development of one outstanding star. A similar problem of unpredictability of performance is found in cases where the man is a practice star and a meet failure. A competitive situation may be sufficiently disturbing psychologically to completely undo all your steps made in preparation for the event.

Some runners are able to do their best under the stress of competition but meet their nemesis in the person of a particular runner whom they are unable to defeat despite their best efforts. The relative ability of the two runners often seems an inadequate explanation for the fact that one consistently beats the other.

Psychological stumbling blocks in performance are perhaps most dramatically seen when we consider the dilemma of world records. The prediction has been made that the running of the four minute mile by Roger Bannister will induce a rash of similar performances in the near future. I fully believe these predictions soon will be borne out, and would like to point out that expectations of this sort could only occur if we consider the problem as being one of penetrating the "psychological time barrier" connected with world records. The psychological stone wall of a world record must make that last second of the race seem like a very slow life time to the runner. In much the same fashion I have often wondered how many men lost the fight before they climbed into the ring with Joe Louis in his prime.

Let us suppose now that I were to poll each of you concerning the best solution to these problems of training and performance that I have mentioned. I think it probable the findings would reveal something less than unanimous agreement on any of them. These problems you face are many in number, they are complex in nature and they are subject to extensive variety in the method of their solution.

In recent years the learning of motor skills has been the subject of scientifically controlled research in a search for some answers that might standardize teaching procedures. A brief account of our progress along this line can make clear to you the direction research has taken and some idea of the knotty problems with which we are now faced. Parenthetically I should inform you that research has not produced any simple, fool-proof, money-back, fully guaranteed solution to these difficulties. However, our typical experiences will prove to be informative.

The typical research on the learning and performing of motor skills has followed a general pattern. Usually two matched groups of persons are chosen as subjects to be studied. As an example, half of the men may be allowed to practice the skill as long as they show interest in doing so while the other half has its practice strictly regulated and planned. After an appropriate length of time the performance of the two groups is compared. Usually some conclusion is reached about the superiority of one method over another in terms of speed of learning and excellence of performance.

A series of such findings have been produced and if races were run in laboratories this would be the end of the story. When these techniques are transferred to the testing ground of live competition it has been found, to our despair, that something new has been added. This uncontrolled factor is sufficiently potent to destroy our reliance on the effectiveness of one particular technique rather than another. We were brought abruptly to the realization that we must be centrally concerned with what goes on inside a man's mind when he participates in these activities.

We soon arrived at the conclusion that method and technique were ultimately playing second-fiddle to a man's motivation. The teaching could be perfect and the results abysmal without the necessary ingredient of an understanding of the meaning of a man's performance to himself and to others. We became aware that any important application of science to the learning of motor skills must first attack the problems of the dynamics of a man's motivation to engage in this activity.

We are unable to estimate what percentage of performance is a direct function of the dynamics of motivation, but I have a feeling that it is analogous to the situation where an ignition key in a car may make up only a small percentage of the total machinery involved, but without it a car will not run. I would go so far as to say that without the proper psychological conditioning there can be no adequate learning or performance. With this conclusion that the dynamics of motivation are a basic essential in any learning,

it is appropriate to examine and discuss this concept as it applies to coaching.

When I use the term "motivation" I am speaking specifically of those factors in personality which are considered important in terms of reward and punishment. Reward and punishment are actually the only tools you have at your command to induce any kind of performance from a human being. We must then seek to understand exactly what is a reward and what is a punishment to the student out for track. Perhaps the role of these factors can best be seen if we use an example from animal learning.

If you wish to teach your dog to heel at command, you have to show him what it is you wish him to do, then you have to reward him with some food or a pat on the head when he does it correctly, and to make the learning rapid and effective you may have to punish him when he does it incorrectly. Now it is a relatively simple thing to know what is rewarding and what is punishing to a dog so we are readily able to train him. The problem with which you are faced is to know what things are similarly rewarding and punishing to a human being. Let's examine one such factor in track men.

We have to ask why a person goes out for track in the first place. Why does he or anyone else care if one human being can run faster, or jump higher than another? More important is the question of why a person engages in these activities despite the fact he may never achieve more than a mediocre standing.

One important factor, and I am sure it is far from being the only one, is the need each of us has to maintain a high level of self-esteem. This self-esteem is best described as a mental estimate that each man makes of himself and his capacities. It is an estimate that also includes a picture of what he aspires to. The model that each of us has of the kind of person we would like to be is a prime motivator to much of our daily activity. We strive constantly to achieve a realization of this ideal picture of ourselves. The more we become like our ideal self picture the higher is our self-esteem. Our failures make us aware of how far from perfect we actually are and produce a lowered self-esteem.

Interestingly enough, most of us have the same basic picture of what things will provide us with high self-esteem. We differ slightly in some details but basically we all strive to accomplish things that will allow us to perceive ourselves as adequate, capable, successful, powerful and admired persons. This sounds somewhat self-centered, but in this respect each of us is our own best friend.

This means that a man goes out for track because he sees this kind of activity as being capable of meeting his strong needs to enhance his self-esteem. For one man, track is uniquely the means to this end; for another man achievement in intellectual activities can enhance his self-esteem where track could not. Thus a man comes to track prepared to find in it some satisfaction for his psychological needs.

Self-esteem is not limited to the person's picture of himself. We all have a need to induce in others a sharing of this picture we have of ourselves. We want our friends to see us as capable, able and superior to others. Few if any of us would engage in our present daily activities if we were to be cast away on a desert island never to have another person see or respond to what we were doing. Much of what we do is produced because of the effect it will have on others. We tend to raise or lower our own self-esteem on the basis of what others think of us and how they perceive us.

The functions of self-esteem can be reduced even further for the track man. Self-esteem is particularly enhanced or deflated by the reactions of one single important person, namely the coach. This becomes an especially vital tool when used properly. The relationship of the team member to his coach is much too complex to attempt to analyze in detail at this time, but it is the single most central factor in eliciting adequate performance from an individual. A core variable is how the coach relates to his individual charges and performance is made or broken on this basis. Most of the clearly psychological difficulties you face, emanate from this relationship. Without going further into this aspect of the analysis I can only suggest something that many of you have discovered early in your coaching careers. Many of you have become aware that this relationship between a coach and his student is complex and difficult to handle because it is inevitably confused psychologically with the previous relationship the student had with his father. The coach as a "father-substitute" is another topic for more detailed consideration at another time. We can complete the limited analysis attempted here by making the final point that many of the difficulties you encounter are not a result of bad handling on your part, but rather a consequence of the impossibility of striving to cope with the unresolved conflicts of an earlier father-son relationship. In this case the sins of the fathers are visited not on their sons, but on their coaches.

Self-esteem, as I have described it to you, is the means by which the coach is able to manipulate the track man's motivation in both the learning and performing situation. An enthusiastic compliment or a studied look of disgust and disappointment can be used to raise or lower a man's feeling of self-esteem in order to spur him on to greater effort. The central problem is to know which to use, in what combination, and in what amounts for each individual member of your track squad. This is why a good coach must also be a good psychologist whether he realizes it or not.

If we can accept placing the psychology of self-esteem in this central position for coaching then clearly we should concern ourselves with discovering more about it and advancing our knowledge of how, when, and under what circumstances it operates. Some advances have been made along this line, but a great deal has yet to be uncovered and then formulated in a systematic way so that it will be useful to you

in the successful accomplishment of your work. Perhaps, this discussion can at least serve to provoke you to examine your own situation in order to discover ways in which you might convert the runners' self-esteem from a stumbling block into an effective method of increasing motivation. Those of you assembled here are in the best position to contribute significantly to advances in this direction.

In concluding this abbreviated analysis of your problems, let me see if I can summarize the path that we have travelled. In eliciting the superior performance of motor skills you are limited by the lack of a basic core of widely accepted and proven methods and techniques that can be taught universally. If you look to the scientific study of these problems for a suitable answer you find we have no magic results that will fill this gap. We lack the capacity to provide you with a ready made cure-all because our research has forced us to pursue a consideration of the vital role played by self-esteem in motivating the person to learn and to perform. The coach's manipulation of the track man's self-esteem, in order to gain maximum motivation, is an extremely complex process and I can only hope that you have been stimulated to be more aware of its central importance for coaching. I would like to conclude by mentioning the most important reason for improving coaching methods by whatever means are available. This is the observation that a consistently winning team has been known to do wonders for the coaches' self-esteem. (Applause)

(Rider) Thank you very much, Dr. McNeil. Folks, hold it just one or two minutes; there are a couple of items of business that we should take care of. I'd like to ask our secretary to give the financial report for the year, which, I may say, has been audited and approved.

(Easton) The report of the National Association of Track Coaches from June 15, 1953 to June 8, 1954. Balance June 15, 1953, \$62.80. Membership fees, active, 128 at \$5 each, \$640.00. Associate memberships, 63 at \$3, \$189.00. Income from sale of Clinical Notes and certificates, \$35.71. Income from two ads in Clinical Notes, \$200. Total income, \$1,064.71. Disbursements for the year, \$775.89. You'll be pleased to learn that on June 8, 1954 the bank balance is \$351.82. Approved by the auditing committee June 11, 1954, George Gauthier, David Rankin and Laurence Snyder.

Gentlemen, I would like very much to express my thanks to all of the coaches who have helped me in this period in which I have been secretary and treasurer of this organization. As you know, at last evening's meeting the job was given or wished upon Fran Dittrich of Michigan State College. May I urge you all to get your money paid in today, the five dollars that you owe to the National Track Coaches Association to Karl Schlademan, immediately behind me. Don't leave without paying because it's difficult for him to get it otherwise and may we urge that the high school coaches who are here get your three dollars paid to Phil Diamond who will be sitting right here, for which you get not only the Clinical Notes, but also Track and Field News. And I'd like to take this opportunity to introduce to you the greatest bug in the United States, Corder Nelson, the Editor of Track and Field News, who is standing right here. (Applause) What he doesn't know he can find out for you. Again let me say that it has been a pleasure to work for the Track Coaches Association and you can rest assured that I'll do everything I can to help Fran do a fine job in the years to come. Thank you.

(Rider) Thanks, Bill. Just one question, one more point. The travel squads, if you have not turned your cards in for transportation, be sure and do that before you leave. And in closing, I want to thank all the members of this clinic and I'm sure Ken Doherty would want me to thank all of them. He regretted very much that he could not be here to take charge of this meeting. I also want to express my personal appreciation to Bill Easton who has been so faithful in his years of service as secretary-treasurer, and to this man right here, Phil Diamond, who has done a tremendous job over the years and who is now our permanent recording secretary. And with that our meeting stands adjourned.

1954
ALL-AMERICAN TRACK AND FIELD TEAM

100 yard Dash	Bob Gary, Washington State College Joe Graffio, University of Southern California Willie Williams, University of Illinois
220 yard Dash	Bob Gary, Washington State College Charles Thomas, University of Texas Rod Wilger, University of Southern California
440 yard Dash	Harold Griffin, Rice Institute James Lea, University of Southern California Ben Youtsey, Purdue University
880 yard Dash	Tom Courtney, Fordham University Peter Gray, University of Michigan Arnold Sowell, University of Pittsburgh
1 Mile Run	Bill Dellinger, University of Oregon Louis Olive, United States Military Academy Wes Santee, University of Kansas
2 Mile Run	Robert Allen, Marquette University Gene Matthews, Purdue University Kikuo Moriya, Wheaton College
120 yard High Hurdles	Willard Thompson, University of Illinois Ken Toye, Northwestern University Willard Wright, University of Southern California
220 yard Low Hurdles	Bill Constantine, University of Missouri Joe Corley, University of Illinois John Mapp, Virginia Military Institute
Pole Vault	Lawrence Anderson, University of California Fred Barnes, Fresno State College R. Earl Poucher, University of Florida
High Jump	Robert Billings, University of Texas Ernest Shelton, University of Southern California Douglas Spainhower, Brigham Young University
Shot Put	Charles Butt, University of California Thomas Jones, Miami University (Ohio) John Stellern, University of California
Broad Jump	Jon Arnett, University of Southern California John Bennett, Marquette University Wilbur Wilson, Virginia State College
Javelin	Al Cantello, La Salle College Leo Long, Stanford University Reinaldo Oliver, University of Puerto Rico
Discus Throw	Jim Dillion, Alabama Polytechnic Institute Desmond Koch, University of Southern California Leon Patterson, University of Southern California

Chosen after NCAA Meet by National Track and Field Rules Committee
Brutus Hamilton, Chairman



